March 1989 Volume 8 Number 3

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MONITORING TIMES

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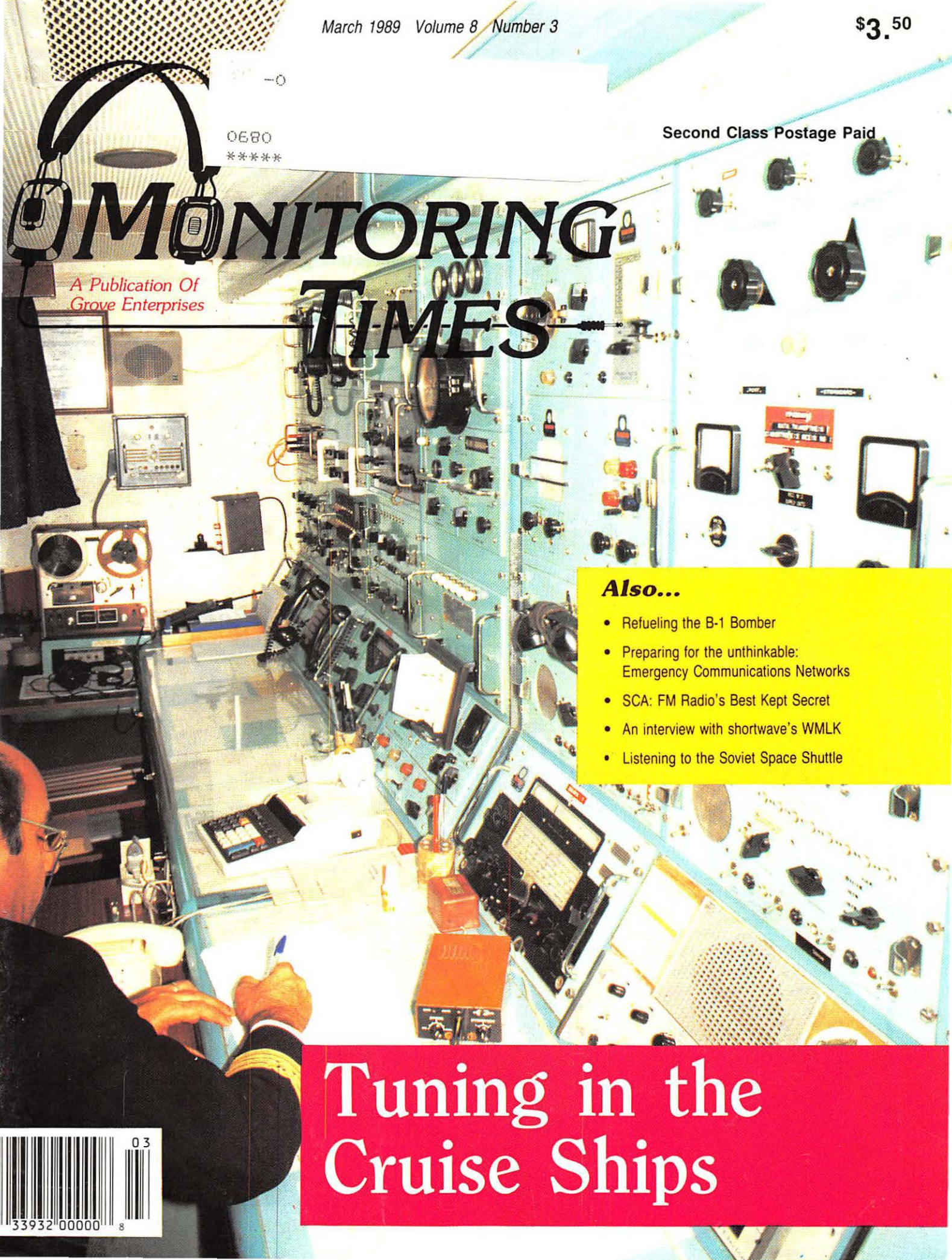

Also...

- Refueling the B-1 Bomber
- Preparing for the unthinkable: Emergency Communications Networks
- SCA: FM Radio's Best Kept Secret
- An interview with shortwave's WMLK
- Listening to the Soviet Space Shuttle

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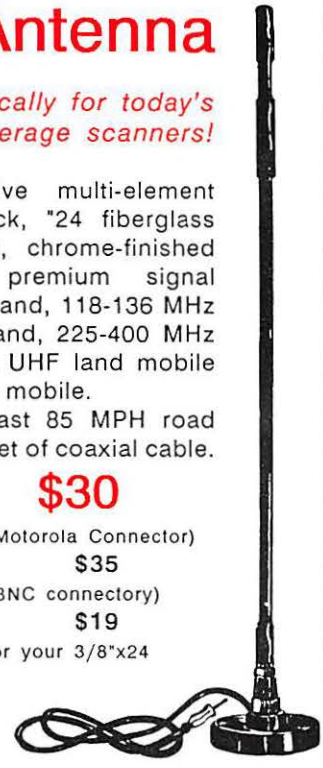

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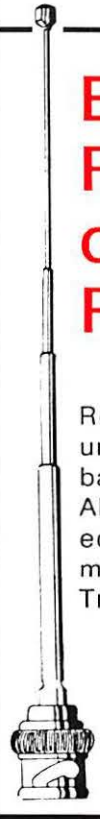

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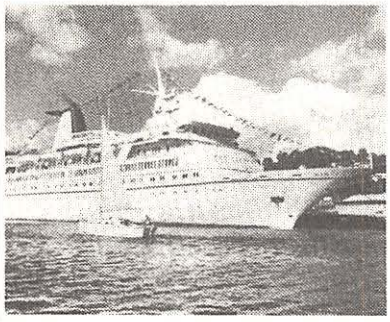
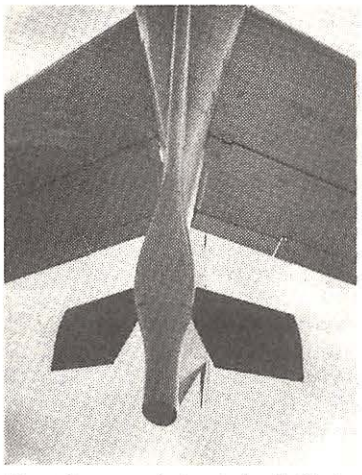
Vol. 8, No. 3 March 1989

MONITORING TIMES



This spring go cruisin' with your radio - p.6



Here's comin' at 'ya! Get ready for mile-high contact at jet-propelled speeds! - p.10

Ike Kerschner puts a couple of pieces of ham equipment through their paces - p.90

Magne compares short-wave antennas - p.88

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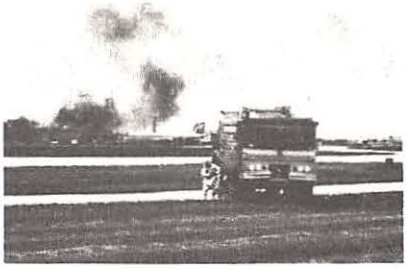
ON THE COVER: George Vellianitis, chief radio man on the Royal Cruise Line's *Royal Odyssey*, is engaged in one of his routine tasks while sailing through the Mediterranean (James Bie)



Inside this Issue

• Once again, *Monitoring Times* scoops the industry with a special report on Emergency Communications Networks. Jack Metcalf takes us behind the scenes for a look at mysterious nets like the Federal Highway Administration (just three or four years old), the new federal "SHARES" net and the Bell Telephone Net. All seem to be around for one purpose: to coordinate evacuations in time of massive emergency. Jack Metcalf tells the story in this month's *Monitoring Times.*

• Many radio hobbyists think that they've got the radio spectrum conquered. They can hear everything that's around to be heard. After all, all you need is a full-coverage receiver, like an ICOM R71A and a good scanner and there are few radio waves that can escape you. That's why it's such a delight to discover something "new." Bruce Elving, Ph.D, brings to our attention FM SCA monitoring. Actually, FM SCA is not new; what makes it appear "new" to many monitors is that it can be received only when you install an inexpensive ($15.00) modification in your radio. That mod is not expensive but oh, boy, is it worth it! • You'll discover a whole world of new "stations" broadcasting as part of your local FM station's signal! Yep, they're hidden there, unheard until you decode them. Check out Dr. Elving's article. See if you're up to exploring the hidden world of SCA, radio's final frontier.

• James Bie comes aboard -- almost literally -- with a visit to the radio room of an ocean-going cruise liner. Bie spent some time with George Velianitis, the Greek radio officer of the Royal Odyssey. Most of George's work is routine, says author Bie, but when things do happen, the radio officer can end up being responsible for hundreds of lives.

• In this issue, you'll have the chance to meet Dr. Jacob Meyer of WMLK. More than just another religious broadcaster on shortwave, WMLK is a fighter. The station is housed in an abandoned gas station and the transmitter was rebuilt from an old AM broadcast unit. Find out about this fascinating station and what they're trying to say as Dave Kammler takes the microphone to the station's Bethel, Pennsylvania, headquarters.

• Finally, in one of the most extraordinary articles we've ever run, you can join Steve Douglass at 35,000 feet, cruising belly-down -- with nothing but a sheet of plexiglass between him and the very hard earth below -- in a KC-135a Stratotanker. Steve is on his way to refuel a B1 bomber. Climb aboard -- if you dare.

• There's all this and more in the March issue of America's favorite monitoring magazine, *Monitoring Times!*

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LETTERS

Norm Pihale of Northfield, Minnesota, enjoys scanning the aero bands. In an effort to find out more about his hobby, he innocently wrote a letter to the Federal Aviation Administration's Minneapolis Air Route Traffic Control Center. In his letter, he asked for a list of public air traffic control call-sign information for U.S. Air Force aircraft. What happened has him really ticked off.

In response to his request, Mr. Pihale received a letter from Air Traffic Manager Jimmie H. Walker. Mr. Walker declined the request for information on call signs. But that's not all.

"With your strong interest in the monitoring of radio traffic," he continued, "we have taken the liberty of forwarding your letter to the United States Air Force..."

Sure enough, one week later, a letter from the Department of the Air Force, Washington, D.C., arrived at the Pihale home. This time, Lt. Col. Robert H. Wooley, told Pihale that the information he requested was classified and "is considered sensitive for national security."

Lt. Wooley then sent a copy of the file on to the Air Force Cryptological Support Center (AFCSC) at Kelly Air Force Base, Texas, to determine, as Mr. Pinhale puts it, "whether a security breach has occurred."

Pihale fired off a letter to AFCSC suggesting to Air Force officials complaining about the handling of his innocent request for information. "Needless to say," says Pihale, himself an honorably discharged Air Force vet, "I have neither the desire nor the intent to compromise National Security by listening to a KC-135 during air refueling over Iowa... If they don't want their stuff to be heard [then] they should scramble it." That sort of thing is always kind of spooky.

Parallel Lines

Remember the story about the high school kid that reportedly caused the FBI enough concern that they started a file on him because he wrote to too many foreign countries? According to the article, the student decided to compile an "encyclopedia" of information on these countries by writing away to them for free information.

Before long, the story goes, mail began to arrive at the high school student's home opened and tampered with. The family began to suspect that their phone was tapped. Anyhow, after some time, it was determined that the FBI actually *did* have a file on the kid. The foreign correspondence apparently tripped off some sort of alarm in the intelligence community. Needless to say, there was no shortage of red faces down in D.C. when it was found out the object of all this attention was a kid doing a high school project.

So what about us DXers who write away for schedules, QSL and the like? I had to wonder. After all, in the years that I've been in this business, I've certainly conducted one heck of a lot of correspondence with foreign countries. In an effort to obtain information for publication, I've used the mails, the telephone and telex. Certainly, if such activities were enough to attract the attention of the FBI or CIA, I should have a file.

So I made a formal request of the FBI and the CIA under the Freedom of Information Act/ Privacy Act. Their response: there is no file under your name or under the name of your employer(s). Tom Kneitel over at *Popular Communications* has a file that dates back to the 1960s or '70s. He's published bits of it. But not me. I don't know whether to be happy or jealous.

In any case, one word of warning. If the FBI or CIA does not maintain a file on you, be forewarned that your FOIA/PA request *begins one.* How do I know? Because when I later asked them to check under a different name, they replied that they indeed did have a file on me and that it contained my previous FOIA/PA request. Some fun, eh?

Did I tell you that the FBI came a'knocking in Brasstown recently? Seems the Cellular Telecommunications Industry Association (CTIA) filed a formal complaint with the U.S. Justice Department against Grove Enterprises, parent company of *Monitoring Times*. Seems they don't like some of the things we're doing. But that's a story better left untold for now.

Coming Up

Les Mattson, early bird that he is, has announced the date for the 3rd Annual North East Scanning News Picnic: July 22. This is a must-attend event for anyone in the Northeastern part of the country. For more information, contact Les at 212 West Broad Street, Paulsboro, New Jersey, 08066. Tell 'em *Monitoring Times* sent 'ya. We'll see you there.

Also on the list is the Rocky Mountain Radio Listener's gathering this month in Westminster, Colorado. For more information on that "do" -- to be held on the 18th of March -- contact Wayne Heinen at 303-699-6335.

[More "Letters" on p.100]

COMMUNICATIONS

Cordless Phone Bring Unexpected Cops

The noise at the back door alarmed David Tartikoff so he headed downstairs with his gun. Sure enough, the figure of a man lurked at his back door. In a moment of panic, Tartikoff fired, hitting the man in the chest.

The man who Tartikoff shot, fortunately, survived because he was wearing a bullet- proof vest. He was a cop, called by Tartikoff's cordless phone, which had run amuck.

According to an article in the *National Enquirer,* thousands of cordless phones across the country are dialing 911 on their own and bringing police where they're not wanted. Experts don't know why the phones do this; the calls are usually made when the phone's batteries are low.

Better New York

In New York City, Police Commissioner Benjamin Ward recently introduced "Operation Interwatch," the nation's first "civilian-operated residential crime fighting radio network." Over 40 buildings are part of the new net. Doormen, school guards and superintendents are all equipped with 2-way UHF handhelds. Police monitor the appropriate frequency.

"We're trying to set up a web of communications in which citizens can report on incidents as they happen," says Lewis Rudin, chairman of the Association for a Better New York (ABNY). "There are never enough funds for fighting crime in New York. Sometimes citizens have to step forward to initiate action which will benefit their community."

Even car telephone owners are getting in on the act. "We don't have the figures," says Massachusetts State Police Cpl. Joseph Howley, "but I know there have been a good number of car-phone calls reporting erratic driving. We'll never know for sure [but] I'll bet that some of the resulting arrests prevented serious injury or fatalities."

A story in the *Patriot Ledger* is more specific, saying that a bank robber was nabbed, a child pulled out of a swamp, and several lives likely were saved after a traffic accident, all because drivers with car phones were close by.

Life-Threatening Skip

Robb Christensen, a dispatcher for the Yarmouth, Massachusetts, heard a call for "289" -- Yarmouth's call number. He answered but quickly realized that what he heard was a dispatcher in Los Angeles, California, trying to reach a fire engine numbered 289. Similarly, a voice called over the Eastham, Massachussetts, rescue frequency sending fire trucks to a building "totally engulfed" in flames. The dispatcher's southern drawl and the unfamiliar address of the blaze made local officials pause long enough to figure out that the inferno was in Houston, Texas. "When the weather's right," says Eastham Fire Chief John Austin, "we can talk to them over the radio."

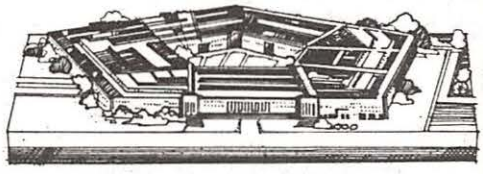
Ralph Swenson, assistant director of the Barnstable County Communications Center, also in Massachusetts, says he is plagued by signals from as far away as Mexico and Cuba. "I guess it'd be more interesting if I could understand what they're saying [in Spanish]." Christiansen labels the broadcasts a "nuisance"; all agree that the nuisance can turn into a hazard when skip "walks over" locals signals. "Last week, the Yarmouth fire department was broadcasting a message when a skip signal wiped them out," says Swenson.

Hi-Def TV for Pentagon

Like high-stakes poker players, the Pentagon has dealt themselves into the U.S. effort to develop "High-Definition" TV. How much did they put up? $30 million dollars. According to the Pentagon, it will spend the money to research advance television technology in the hope that it -- and the U.S. -- won't be left behind when a new generation of TV sets hits the market.

Is the Pentagon really that concerned that you are able to watch crystal clear editions of *Falcon Crest* and *Giraldo*? Not really. The Pentagon has funded TV design work for 20 years. The military, it seems, depends on hi-resolution graphics for multi-media displays, computer simulations, intelligence analysis and mapping.

Few U.S. companies seem ready to bite. TV sets, they say, quickly become standardized, causing prices -- and profits to fall. Only one U.S. company,



COMMUNICATIONS

Zenith Electronics Corp., makes TV sets at all and, according to the *Wall Street Journal*, "it hasn't usually been profitable."

Hands On

Ever buy a radio and wonder why in tarnation the company decided to put two knobs so close together that you couldn't turn them without crushing your fingers? Or find an LED frequency display with no lighting? Ever wish you could get in there and straighten out these bozos *before* they manufactured the radio? If you're a ham operator, now is your chance.

Yaesu USA will be inviting eleven people to join the company's special design advisory council. The team will meet June 14th through the 16th. Those invited will be asked to share their thoughts and ideas on features they'd like to see in amateur radio equipment. Flown to company headquarters in Southern California at company expense, the lucky hams will also tour the Jet Propulsion Laboratory and Disneyland.

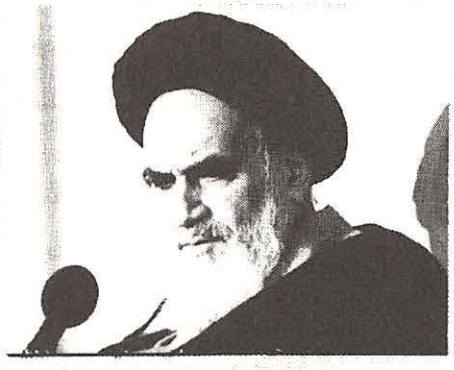
For more information or to obtain an application form, call 1-800-999-2070. Good luck and tell 'em *Monitoring Times* sent 'ya.

Save the ASWLC

During the latter part of 1988, the American Shortwave Listener's Club suffered a sudden drop in membership. This loss of revenue, combined with additional losses incurred when the club hosted the 1988 ANARC convention, put the ASWLC on the brink of bankrupcy. Club officials decided to cancel their January, February and March issues. The December issue, which had been printed, was not mailed for lack of postage.

Stewart MacKenzie, General Manager of the 30 year old club, did eventually come up with sufficient funding to mail the December issue and says that "The interest is out there so we will continue."

The American Shortwave Listener's Club deserves your support. Annual dues are a mere $17.00 in the U.S. and it is worth the risk to save this historic club. Send your check or money order to ASWLC, 16182 Ballad Lane, Huntington Beach, California 92649. We wish the ASWLC and all the ANARC-member clubs the best of luck!



Punishment for Bad Radio

It was one of those stories that breezed past us on the radio. The details may not be exactly correct but the general idea is right. The story went something like this: On a recent interview broadcast over Iranian radio, two teen age girls happened to mention that their role model was a particular Japanese actress.

A disgrace, said the Ayatollah Khomeini, who happened to be listening. Mohammed's daughter, who died 1,400 years ago, should be the role model for all Islamic girls. Station officials should have edited-out any other response.

For their oversight, station officials paid dearly. Several were publicly flogged and given 20 year-plus prison sentences. The head of the station, probably the luckiest of the lot, was executed. No word on what happened to the two girls who started the whole thing.

Reward for Marconi Bust

In what we hope was only a remarkable coincidence, just as the February issue of *MT* was going to press with the original Marconi station site on its cover, the bronze bust of Marconi was stolen from its pedestal at the Cape Cod National Seashore. Long-time subscriber Anthony Bonanno, Chief Ranger at the park, has sent a plea to *MT* readers to help locate the missing statue. There is even a $2,500 reward for information leading to the apprehension of those responsible and the return of the sculpture.

The bronze bust was presented in 1974 to the people of the United States by Italian industrialists to mark the 100th anniversary of Marconi's birth. The sculpture was created by a Massachusetts native and cast in Rome -- an artistic value estimated at $25,000 -- but no one knows more than the radio community that its true value is commemorative and cannot be measured in dollars.

To aid in its recognition, the bust stands about 18-20 inches high, is 12 inches wide and will have a jagged base, as it was damaged when pried from the pedestal. If you have any information you feel may be helpful, please call the Cape Cod National Seashore park office at [508] 349-3785 or the Wellfleet Police Dept. at [508] 349-3702.

Cape Cod Times (via Duncan Edes, Dennis Part, MA), *National Enquirer, Wall Street Journal,* National Park Service

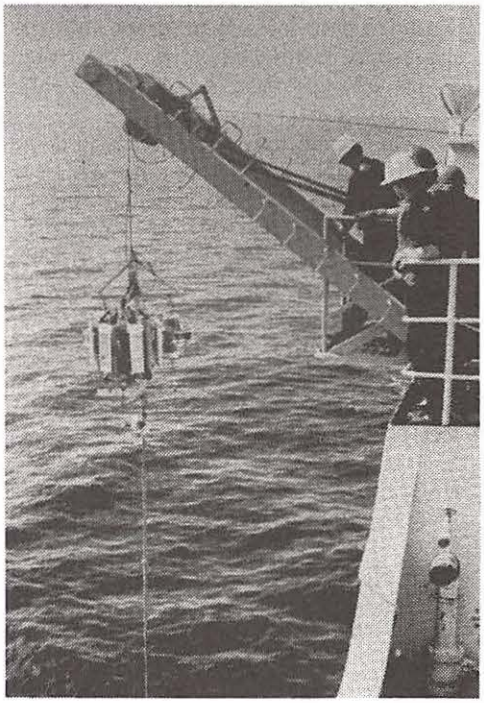
Cruising for Communications

by James A. Bie

DIT-DIT-DIT DAH-DAH-DAH
DIT-DIT-DIT

The S-O-S flashed across the frigid waters of the north Atlantic just after midnight. It was April 15, 1912. The "unsinkable" *Titanic*, ripped open by an iceberg, was sinking.

The radio operator beamed his call for help into the black skies. Less than 20 miles away, the *Californian* sailed peacefully along its prescribed route. Close enough to rush to the rescue. But no one on board was listening.



The International Ice Patrol was formed after the disastrous voyage of the TITANIC. Not that I was anticipating icebergs in the Mediterranean ... (Photo courtesy IIP)

Eventually the Cunard liner *Carpathia* arrived -- an hour and 20 minutes after the *Titanic* had slipped beneath the waves. A new cemetery had already been created at 41 degrees 46 minutes N, 50 degrees 14 minutes W for 1,513 people.

As a result of that tragedy, the International Ice Patrol was established in 1913. Since then, the U.S. Coast Guard has broadcast iceberg reports twice daily, warning all ships in the north Atlantic of potential hazards.

In addition, the First International Convention for Safety of Life at Sea was called in London in 1913. One of the rules adopted require ships to maintain a 24-hour radio watch for distress signals.

I was sailing on the Royal Cruise Line's *Royal Odessey* recently on a two week cruise of the Mediterranean Sea. The chances of hitting an iceberg off the coast of the Riviera seemed a bit remote, but I still was interested in the operation of the ship's radio room. I wondered how the Greek radio operator would communicate with port authorities in Portugal, Gibraltar, Spain, France, Italy, and Turkey. Greece, I felt sure, he could handle.

Three years ago, terrorists had hijacked a cruise liner in this very same part of the world and killed one American passenger. And more recently, an attack on a ferry boat near Athens resulted in the death or injury of 29 people. The officers of the *Royal Odyssey* would certainly be alert to protect their 800 passengers and 360 crew members.

To anyone who is contemplating a Mediterranean cruise, I'm pleased to report there was no danger from terrorists. We did not see any pirates. And there was not a single warning of icebergs in the vicinity.

But the radio room was always on the alert. The comfortable facility, located immediately aft of the bridge, is staffed around the clock. Three men take alternating shifts of four hours on and eight hours off.

Chief radioman George Vellianitis said, "All voice contact with foreign ports is in English. That has become the international language. We notify all ports when we are coming in, but we do not use the radio room while in any port to avoid disrupting local radio and television."

As you might expect, most of the work is routine and unexciting. The vast majority of cruise line passengers will never be involved in -- or even witness -- a serious incident, but accidents and collisions still occur at sea.

George described the recent sinking of the *Jupiter*, a Greek cruiser from the Epirotiki Line. He said, "She was leaving the harbor at Piraeus (Athens) last week for a short tour of the Greek islands when an Italian freighter rammed and sunk her." The passengers were mostly students heading out for a long weekend. One was killed. Two members of the crew of the freighter were killed.

George said, "It all happened so quickly and in view of the harbor facilities that there was no time or need for radio messages. But it reminds us to be alert at all times and ready for any emergency."

The radio operators are conscientious in listening for any other ships that may be in trouble. Twice each hour, from 15 to 18 minutes after the hour and again from 45

to 48 minutes after the hour, they monitor the distress frequencies of 500 kilocycles to search for problems in the area.

While we were off the coast of southern France, radioman Sakis Zinos picked up an SOS. The *St. Nictarios*, a Panamanian flag ship, was aground off the coast of Libya. A crew of 15 was in danger, but the *Royal Odyssey* was too far away to be of assistance. Luckily, a Dutch ship was nearby, heard the message, and went to their rescue. No one was lost or injured.

One of the *Royal Odyssey* passengers related a more serious incident that occurred while he was aboard the Holland-American liner *SS Rotterdam* on an Alaskan cruise in 1984. They were heading toward Vancouver on the last day of their trip when the public address system broadcasted an alert. "We regret to inconvenience you," the captain said, "but we have received an SOS and must respond."

A single mayday call had been picked up by the radioman. He could not pinpoint the location of the ship. Alerting the U.S. Coast Guard, they soon learned the general course the ship should have been on. The search might take hours -- or days -- but the *Rotterdam* was now a member of the search team. It would take orders from the Coast Guard until released from duty by the Guard.

Through 25-foot waves and fighting 55-knot winds, the *Rotterdam* soon sighted two life rafts filled with 20 cold, wet, and frightened survivors. The huge ship could not approach the tiny rafts in the rough sea without endangering them further. Radio contact between the *Rotterdam* and Coast Guard helicopters from the United States and Canada soon lifted the victims to safety. The international rescue effort, triggered by a single radio message, saved 20 lives because of the vigilance of a cruise ship radioman.

In addition to listening for distress signals and monitoring ship traffic, the radio operators check for messages from England every hour on the hour, and from the United States at ten minutes before each hour.

Sakis pointed out that the radio room is not involved in the actual navigation of the *Royal Odyssey*. The officers on the bridge maintain direct contact with the NAVSAT satellite. They can pinpoint their position on their maps and charts at any time with an accuracy of two or three feet.

Similar navigational aid is provided in the Atlantic Ocean by INMARSAT, in the Pacific Ocean by COMSAT, and in the Indian Ocean by MARSAT.

Much of the work of the radio crew is providing service to the passengers. Some of the newer cruise ships can handle radio telephone calls from every cabin. On the *Royal Odyssey*, all ship-to-shore telephone communications take place on a Raytheon, Ray-77, VHF FM radiotelephone in a special booth outside the radio room. It doesn't matter if you are calling your office to close a million dollar deal, or calling home to see if the lawn sprinklers were turned off, there is a standard charge of $12.50 a minute.

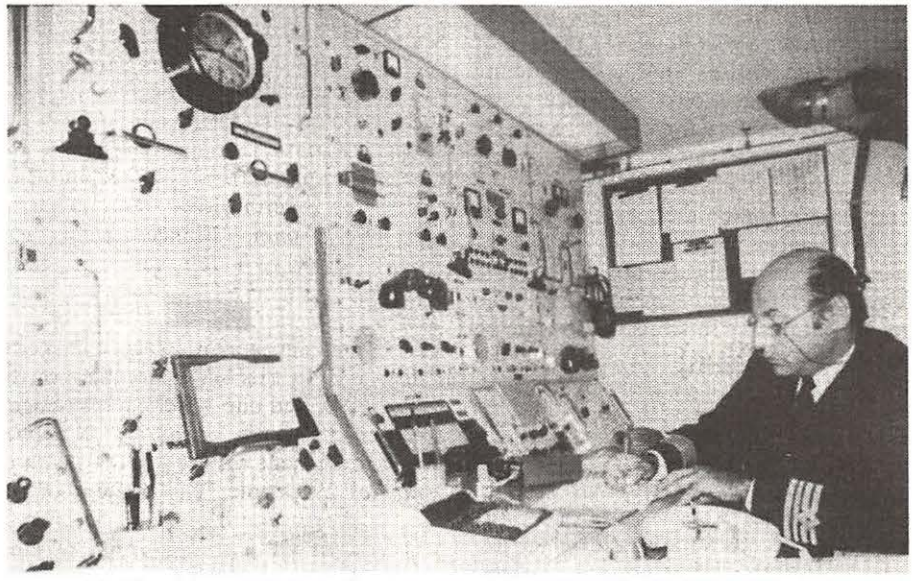
"Only ten percent of the action in the radio room still relies on the Morse code," George said, "but that is the way we get our regular weather reports." The daily weather report in the Mediterranean was keyed in from Rome as George transcribed all the details. An AKAI GX-210D tape machine also recorded the weather message in case there was any reason for the operator to check back for clarification.

Even though the passengers are cruising to "get away from it all" for a couple weeks, they still want to know how the stock market is behaving and if the White Sox won or lost. The radio room is responsible for bringing in the headlines and news highlights each morning at 7:15.

For $30 a day, the *Royal Odyssey* receives the news from Maripress via COMSAT. It comes in on a Telex-Model 42. By mid-morning, a two page summary of everything important in world politics, sports, and business is slipped under the door of every cabin on the ship.

In 14 days the *Royal Odyssey* visited 12 different ports in seven countries. The radiomen can go ashore at the various ports. And in the evening, those who are not on duty put on their dress uniforms and join the passengers in the cocktail lounge or disco.

Most of us who work for a living go home at the end of the day to be with our families. If we are lucky, we might spend a



George Vellianitis, chief radio man on the ROYAL ODYSSEY at the time of this article, engaged in one of his routine tasks while sailing through the Mediterranean -- receiving the daily area weather report from Rome by Morse code (photo by author)

Listen to the Cruise Ships

Cruise ships may roam the world, but most U.S. monitors should be able to pick them up as they draw near our coasts. Several of the largest U.S. coastal stations are run by AT&T, and are reprinted here from their brochure. For a complete, worldwide listing of maritime radiotelephone allocations, see the *Monitoring Times* January 1989 issue.

WOM
Ft. Lauderdale, Florida

Channel Designation	Coast Station Transmit (Carrier)	Ship Station Transmit (Carrier)
—	2182.0	2182.0
209	2490.0	2031.5
247	2442.0	2406.0
221	2514.0	2118.0
245	2566.0	2390.0
423	4425.6	4131.2
417	4407.0	4112.6
412	4391.5	4097.1
403	4363.6	4069.2
825	8793.3	8269.4
810	8746.8	8222.9
805	8731.3	8207.4
802	8722.0	8198.1
814	8759.2	8235.3
831	8811.9	8288.0
1215	13,144.2	12,373.4
1209	13,125.6	12,354.8
1208	13,122.5	12,351.7
1206	13,116.3	12,345.5
1223	13,169.0	12,398.2
1230	13,190.7	12,419.9
1616	17,279.4	16,506.5
1611	17,263.9	16,491.0
1610	17,260.8	16,487.9
1609	17,257.7	16,484.8
1601	17,232.9	16,460.0
2222	22,661.1	22,065.1
2216	22,642.5	22,046.5
2215	22,639.4	22,043.4

WOO
Manahawkin, New Jersey

Channel Designation	Coast Station Transmit (Carrier)	Ship Station Transmit (Carrier)
242	2450.0	2366.0
232	2558.0	2166.0
—	2182.0	2182.0
422	4422.5	4128.1
416	4403.9	4109.5
411	4388.4	4094.0
410	4385.3	4090.9
826	8796.4	8272.5
815	8762.3	8238.4
811	8749.9	8226.0
808	8740.6	8216.7
1228	13,184.5	12,413.7
1211	13,131.8	12,361.0
1210	13,128.7	12,357.9
1203	13,107.0	12,336.2
1631	17,325.9	16,553.0
1626	17,310.4	16,537.5
1620	17,291.8	16,518.9
1605	17,245.3	16,472.4
2210	22,623.9	22,027.9
2205	22,608.4	22,012.4
2201	22,596.0	22,000.0
2236	22,704.5	22,108.5

KMI
Point Reyes, California

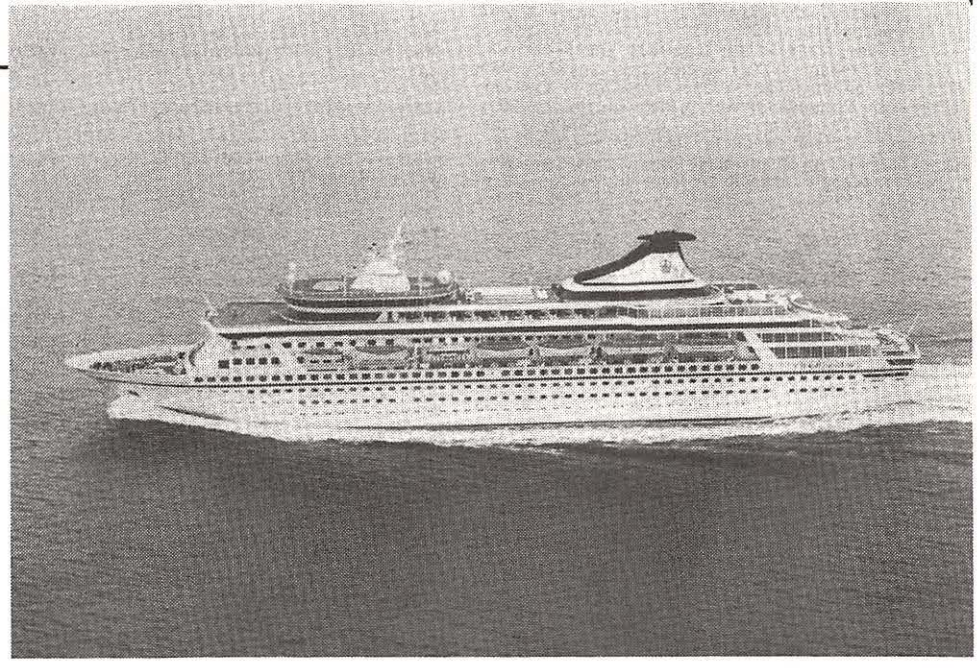
Channel Designation	Coast Station Transmit (Carrier)	Ship Station Transmit (Carrier)
242	2450.0	2003.0
248	2506.0	2406.0
—	2182.0	2182.0
417	4407.0	4112.6
416	4403.9	4109.5
401	4357.4	4063.0
822	8784.0	8260.1
809	8743.7	8219.8
804	8728.2	8204.3
1229	13,187.6	12,416.8
1203	13,107.0	12,336.2
1202	13,103.9	12,333.1
1201	13,100.8	12,330.0
1624	17,304.2	16,531.3
1603	17,239.1	16,466.2
1602	17,236.0	16,463.1
2236	22,704.5	22,108.5
2228	22,679.7	22,083.7
2223	22,664.2	22,068.2
2214	22,636.3	22,040.3

week or two of our vacation on a cruise ship. The officers and crew of a cruise ship, however, may be at sea for six to nine months without a visit home. At the end of this particular cruise, George was looking forward to his vacation -- a chance to go home to the Greek island of Paxi to see his wife and three daughters.

Being a radioman on a cruise ship is a job that may appear more exciting and glamorous than it really is. For the radio hobbyist, however, monitoring the communications of a cruise ship can be great fun.

mt

The International Call Signal issued to Royal Cruise Line for the *Royal Odyssey* was SVBD. Royal Cruise Lines recently sold the *Royal Odyssey* to Regency Cruises, reportedly for $24,000,000. It is now sailing in the Caribbean area under the name of *Regent Sun*.



Cruise ships, such as the new 1,000-passenger CROWN ODYSSEY pictured above, ply the waters of the Mediterranean, the Orient, the Caribbean, the Pacific -- anywhere adventurous people want to go! (photo courtesy Royal Cruise Line)

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$12,000,000 Scanner Sale

Uniden Corporation of America has purchased the consumer products line of Regency Electronics Inc. for $12,000,000. To celebrate this purchase, we're having our largest scanner sale in history! Use the coupon in this ad for big savings. Hurry...offer ends September 30, 1989.

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COUPON COUPON

Get special savings on the scanners listed in this coupon. This coupon must be included with your prepaid order. Credit cards, personal checks and quantity discounts are excluded from this offer. Offer valid only on prepaid orders mailed directly to Communications Electronics Inc., P.O. Box 1045 – Dept. UNI6, Ann Arbor, Michigan 48106-1045 U.S.A. Coupon expires September 30, 1989. Coupon may not be used in conjunction with any other offer from CEI. Coupon may be photocopied. Add $11.00 for shipping in the continental U.S.A.

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Bearcat 200XLT-T $249.95
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Uniden PRO500D-T1.....$32.95

COUPON COUPON

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Bearcat® 760XLT-T

List price $499.95/**CE price $244.95/SPECIAL**
12-Band, 100 Channel • Crystalless • AC/DC
Frequency range: 29-54, 118-174, 406-512, 806-956 MHz. Excludes 823.9875-849.0125 and 868.9875-894.0125 MHz.
The *Bearcat* 760XLT has 100 programmable channels organized as five channel banks for easy use, and 12 bands of coverage including the 800 MHz. band. The *Bearcat* 760XLT mounts neatly under the dash and connects directly to fuse block or battery. The unit also has an AC adaptor, flip down stand and telescopic antenna for desk top use. 6-5/16" W x 1⅝" H x 7⅜" D. Model **BC 590XLT-T** is a similar version without the 800 MHz. band for only $194.95. Order your scanner from CEI today.

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Regency® RH256B-T

List price $799.95/**CE price $299.95/SPECIAL**
16 Channel • 25 Watt Transceiver • Priority
The *Regency* RH256B is a sixteen-channel VHF land mobile transceiver designed to cover any frequency between 150 to 162 MHz. Since this radio is synthesized, no expensive crystals are needed to store up to 16 frequencies without battery backup. All radios come with CTCSS tone and scanning capabilities. A monitor and night/day switch is also standard. This transceiver even has a priority function. The RH256 makes an ideal radio for any police or fire department volunteer because of its low cost and high performance. A *60 Watt* VHF 150-162 MHz. version called the **RH606B-T** is available for $429.95. A UHF 15 watt, 16 channel version of this radio called the **RU156B-T** is also available and covers 450-482 MHz. but the cost is $454.95.

★★★ Uniden CB Radios ★★★

The *Uniden* line of Citizens Band Radio transceivers is styled to compliment other mobile audio equipment. Uniden CB radios are so reliable that they have a two year limited warranty. From the feature packed PRO 810E to the 310E handheld, there is no better Citizens Band radio on the market today.

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PRO330E-T *Uniden* 40 Ch. Remote mount CB...$104.95
PRO500D-T *Uniden* 40 Channel CB Mobile $38.95
KARATE-T *Uniden* 40 channel rescue radio $53.95
GRANT-T *Uniden* 40 channel SSB CB mobile....$166.95
MADISON-T *Uniden* 40 channel SSB CB base...$244.95
PC122-T *Uniden* 40 channel SSB CB mobile.....$119.95
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Bearcat® 200XLT-T

List price $509.95/**CE price $254.95/SPECIAL**
12-Band, 200 Channel • 800 MHz. Handheld Search • Limit • Hold • Priority • Lockout
Frequency range: 29-54, 118-174, 406-512, 806-956 MHz. Excludes 823.9875-849.0125 and 868.9875-894.0125 MHz.
The *Bearcat* 200XLT sets a new standard for handheld scanners in performance and dependability. This full featured unit has 200 programmable channels with 10 scanning banks and 12 band coverage. If you want a very similar model without the 800 MHz. band and 100 channels, order the **BC 100XLT-T** for only $189.95. Includes antenna, carrying case with belt loop, ni-cad battery pack, AC adapter and earphone. Order your scanner now.

Bearcat® 800XLT-T

List price $549.95/**CE price $259.95/SPECIAL**
12-Band, 40 Channel • No-crystal scanner Priority control • Search/Scan • AC/DC
Bands: 29-54, 118-174, 406-512, 806-912 MHz.
The Uniden 800XLT receives 40 channels in two banks. Scans 15 channels per second. Size 9¼" x 4½" x 12½." If you do not need the 800 MHz. band, a similar model called the **BC 210XLT-T** is available for $178.95.

Bearcat® 145XL-T

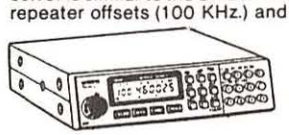
List price $189.95/**CE price $94.95/SPECIAL**
10-Band, 16 Channel • No-crystal scanner Priority control • Weather search • AC/DC
Bands: 29-54, 136-174, 406-512 MHz.
The *Bearcat* 145XL is a 16 channel, programmable scanner covering ten frequency bands. The unit features a built-in delay function that adds a three second delay on all channels to prevent missed transmissions. A mobile version called the **BC560XLT-T** featuring priority, weather search, channel lockout and more is available for $94.95. CEI's package price includes mobile mounting bracket and mobile power cord.

President® HR2510-T

List price $499.95/**CE price $239.95/SPECIAL**
10 Meter Mobile Transceiver • Digital VFO Full Band Coverage • All-Mode Operation Backlit liquid crystal display • Auto Squelch RIT • Preprogrammed 10 KHz. Channels
Frequency Coverage: 28.0000 MHz. to 29.6999 MHz.
The *President* HR2510 Mobile 10 Meter Transceiver made by Uniden, has everything you need for amateur radio communications. Up to 25 Watt PEP USB/LSB and 25 Watt CW mode. Noise Blanker. PA mode. Digital VFO. Built-in S/RF/MOD/SWR meter. Channel switch on the microphone, and much more! The HR2510 lets you operate AM, FM, USB, LSB or CW. The digitally synthesized frequency control gives you maximum stability and you may choose either pre-programmed 10 KHz. channel steps, or use the built-in VFO for steps down to 100 Hz. There's also RIT (Receiver Incremental Tuning) to give you perfectly tuned signals. With receive scanning, you can scan 50 channels in any one of four band segments to find out where the action is. Order your HR2510 from CEI today.

NEW! President® HR2600-T

List price $599.95/**CE price $299.95/SPECIAL**
10 Meter Mobile Transceiver • New Features
Delivery for this new product is scheduled for June, 1989.
The new *President* HR2600 Mobile 10 Meter Transceiver is similar to the *Uniden* HR2510 but now has repeater offsets (100 KHz.) and CTCSS encode.



BC760XLT
800 MHz. mobile scanner
SPECIAL!

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If you purchase a scanner, CB, radar detector or cordless phone from any store in the U.S. or Canada within the last 30 days, you can get up to three years of extended service contract from Warrantech. This service extension plan begins *after* the manufacturer's warranty expires. Warrantech will perform all necessary labor and will not charge for return shipping. Extended service contracts are not refundable and apply only to the original purchaser. A two year extended contract on a mobile or base scanner is $29.99 and three years is $39.99. For handheld scanners, 2 years is $59.99 and 3 years is $79.99. For radar detectors, two years is $29.99. For CB radios, 2 years is $39.99. For cordless phones, 3 years is $34.99. Order your extended service contract today.

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TS2-T *Regency* 75 channel scanner.....$269.95
UC102-T *Regency* VHF 2 ch. 1 Watt transceiver...$114.95
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MFF-T Midwest Federal Frequency directory.....$14.95
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Refueling the B-1b Strategic Bomber

by Steve Douglass

The recent crash of an Air Force B-1 bomber underscores the danger faced by those men and women who have chosen to serve our country in the military. Whether it is hazardous duty in the Persian Gulf or flying a "routine" shake-down mission of a new and untried bomber, the risks are the same: it's possible that one could lose his life in defense of country. All too often the danger is dismissed as simply "part of their job." Here is a close look at one aspect of "the job"; a routine but dangerous mission called mid-air refueling.

Take two high speed aircraft. Load one with thousands of pounds of volatile jet fuel. The other, a strategic bomber, is loaded with nuclear cruise missiles. Hurl both pieces of hardware toward each other on an intercept course at 500 miles an hour. Carefully maneuver them to within 30 feet of each other. Then try passing jet fuel through a metal pipe protruding from the back of one jet into a very small fuel port located on the nose of the other jet.

This tricky piece of flying must be done perfectly, even in the worst of conditions. Bumpy weather, rainy skies, and the darkest of nights are no excuse for failure. A dangerous and exciting stunt? No. This aerial ballet, otherwise known as mid-air refueling, is performed numerous times a day throughout the world by the Strategic Air Command. The meek need not apply for this job that mixes fast jets, tricky flying, and raw nerves. With all of these drawbacks, how could I pass up their invitation to come along? This is my account of flying with the "Fightin' 340th" Air Refueling Wing.

Pilots Eric Roberts (left) and Steve Boozer make sense out of the maze of dials and knobs that control the KC-135 tanker.

We took off in a KC-135a Stratotanker stationed at Altus Air Force Base, Oklahoma, home of the 340th Air Refueling Wing of Strategic Air Command. The interior of the tanker was hot and smelled of jet fuel but soon began to cool down as we climbed into a hazy Oklahoma sky.

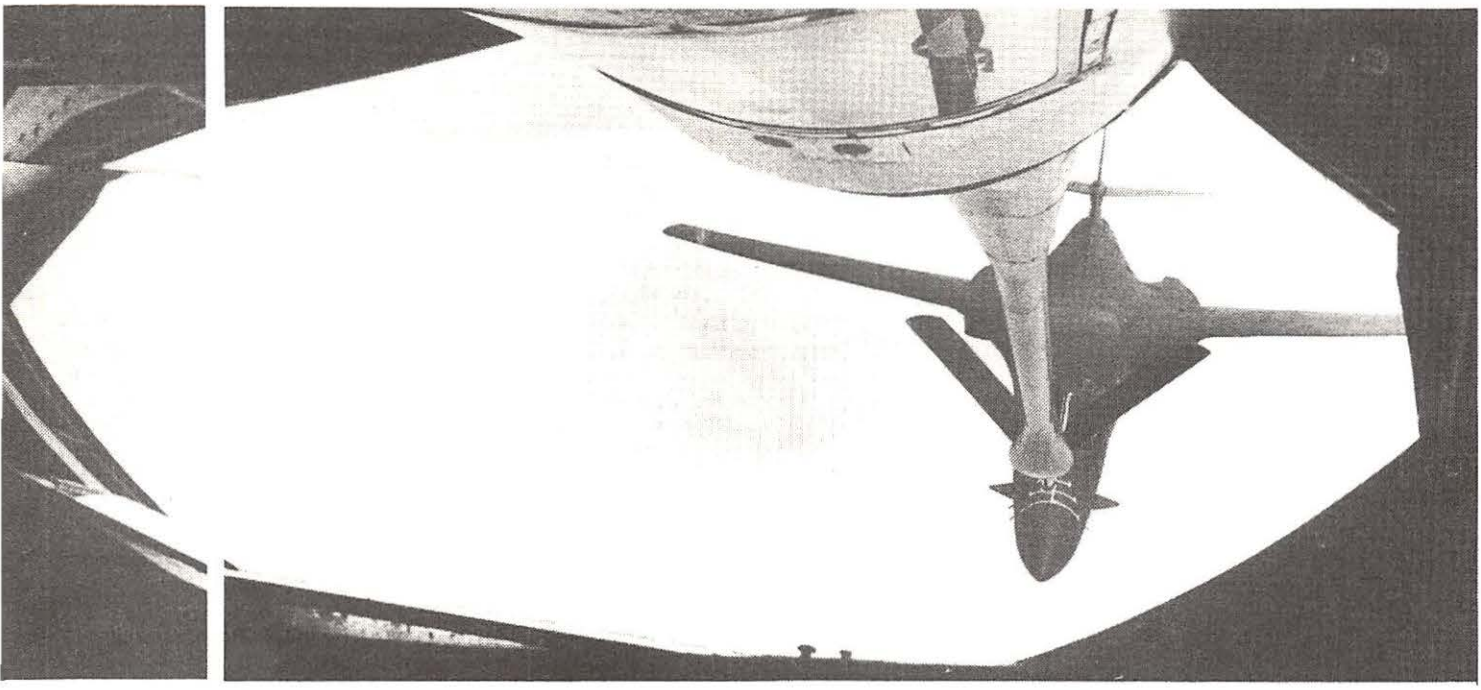
We would be refueling the Air Force's newest acquisition, the B-1b strategic bomber. Our flight plan would carry us over central and east Texas into Louisiana to refuel the bomber. Soon we broke out of the hazy layer and into clear air. Off in the distance I could see bulbous thunderheads reaching into the sky.

I borrowed a spare headset from the navigator and listened to the flight controllers over the UHF military band radio. The radio frequency was very crowded. I could hear several air control centers and military aircraft all talking at once. At the altitude we were cruising -- 35,000 feet -- it was easy to hear radio chatter from centers stretching from Florida to New Mexico. How the pilot could sort out his instructions from the confusing din was a mystery to me.

I soon learned that our callsign was SPAD-One Three, and I began to sort out what calls were meant for us. Off in the distance I spotted an airliner lower than us descending for Dallas-Fort Worth airport. It was a 707, the civilian version of the aircraft we were flying in. Ours was outfitted quite differently.

The KC-135 we were in had no luxury appointments. A bare bones, no nonsense interior. The decor was military practicality. Wires and control cables were not hidden in leather padded walls, but were fully exposed for easy access. The only seats were fold-up troop carrier types. This was a plane built for utility, not for ferrying commuters.

This airplane, and others like it, stand on alert in case of war. Bombers, fighters, and communications control aircraft all depend on the fleet of airborne gas stations to keep them flying. The precious cargo of JP-5 or JP-7 fuel carried in the numerous cells throughout the



The view from the rear: To refuel the B-1 bomber, "boomer" Anthony "Taco" Cleaver lies on his stomach with his chin in a rest. Keeping constant radio contact with the B-1, he guides the boom with controls below him. (Steve Douglass)

plane would be of great strategic importance should a conventional or global thermo-nuclear war break out.

It would be hours before we rendezvoused with the B-1, so the flight commander, 1st Lieutenant Eric Roberts, explained a few things about the layout of the cockpit. On the middle console between the pilot and co-pilot were a series of fuel gauges numbered one through twelve, one for each of the bladders that held the jet fuel.

He explained to me that when fuel is transferred to another aircraft, it has to be passed from the tanks in a certain sequence. The fuel must be drawn from one cell, and then an equal amount from another cell on the opposite side to keep the tanker from becoming unbalanced. Equalizing the weight of the fuel ensures the most stable handling possible, a must when flying in close proximity to another aircraft.

All but about 45 minutes of fuel may be transferred via a high-speed extendable boom. This is accomplished by an operator called a "boomer" lying on his stomach, peering through a window at the rear of the aircraft. The fuel transfer boom has small wings, like the tail of a Beechcraft, that enable it to be flown into the refueling receptacle on the receiver, usually located on the nose of the aircraft, dangerously close to the windshield. Precise flying is a must between two large aircraft flying very close to each other. There is the potential of a mid-air collision if the slightest mistake is made.

Air refueling is done on an invisible racetrack in the sky. The tanker will fly in a previously established A.R.C.P., Aircraft Receiver Control Point, an oval course where the refueling is to take place. All commercial traffic is kept out of the area. This is the job of the air traffic controllers on the ground. The controllers also guide the B-1b and the KC-135 to an I.P., an Interception Point. Then both aircraft link up inside the track for refueling.

I could hear through my headset the controllers directing the bomber to us. The B-1 was a little late getting off, so we arrived at the I.P. first. A beautiful storm cloud towered above us in the middle of our track, but the air surrounding it was as smooth as a country pond, perfect conditions for refueling. While waiting for the bomber, the pilot flew the tanker in a graceful circle around the storm. The plane banked slightly, the horizon tilted and we traced a lazy arc around the anvil-shaped cloud.

The sky above was dark even though it was mid-day. I could see stars blinking brightly in a cobalt blue sea. The pilot pointed out how the thunderhead had shot up a thousand feet in just the few minutes we had been circling it. "That will be one tough storm by this evening," he remarked. I didn't doubt him. It was quite impressive. A boiling, diaphanous mass, building in its size and power. The storm was frightening, yet beautiful.

On board the bomber a radio navigator beacon was emitting its signal. An instrument in the tanker received this electronic pulse and processed it to show the direction and the distance to the bomber. The navigator, Steve Westerback, was busy plotting the course of both aircraft on an aeronautical chart. Two lines drawn on the map, representing both planes, were converging rapidly.

The navigator very matter of factly explained that the aircraft would intercept each other head on. The B-1 would be lower than us and off to the right. The tanker would then turn right in front of the bomber so it would end up below and behind us. From there the bomber would approach the refueling boom in the tail of our tanker. The radio compass alerted the pilot that the B-1 was about thirty miles out.

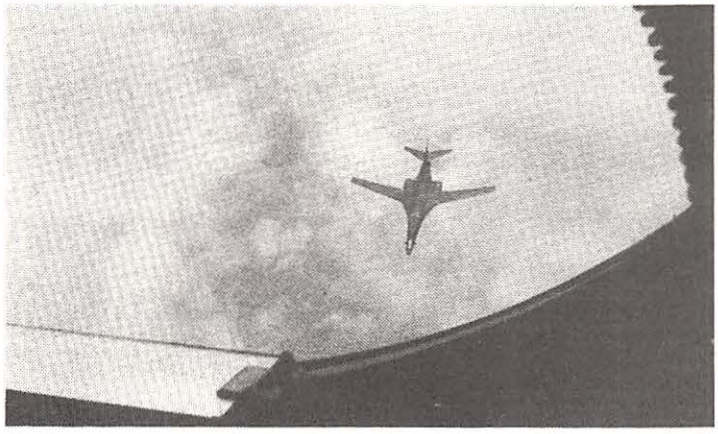
We began to scan the sky through the cockpit plexiglass in search of the approaching bomber. Off to the right was an extremely bright bluish-white thunderhead. The sun glaring off the cloud made it very hard to see. Squinting into the glare, I picked out, against the storm, a small black dot growing larger. Losing my professional cool, I shouted, "I think I see him," and pointed in the direction of the dark speck. The pilot squeezed his mike button and said, "Got him." Immediately, the tanker was thrown into a hard left bank, turning in front of the bomber.

I hurried with my camera gear to the back of the plane, struggling to keep my balance in an aircraft engaged in a steep turn.

When I arrived in the tail, the boom operator, Anthony "Taco" Cleaver was already in position. In the belly of the craft was the "boom pod," a panoramic window looking down at the refueling boom.

The boom was now swinging free of its restraint in the tail. The boomer is on his belly with his chin in a padded rest looking out of his window. He has on a headset and is communicating via radio to the receiver.

On both sides of the boomer were two other



Approach: Looking like an oversized bat, the B-1b bomber approaches the refueling boom.

windows for observers or boom operator trainees. I knelt down, stretched out on the padded pallet and onto my stomach. It surprised me how cold it was. There was no heat back here and the minus forty degree outside temperature radiated through the thin skin of the plexi. I stuck my nose against the window to get a better look and it immediately froze the tip. Risking frostbite, I pressed against the glass and looked down.

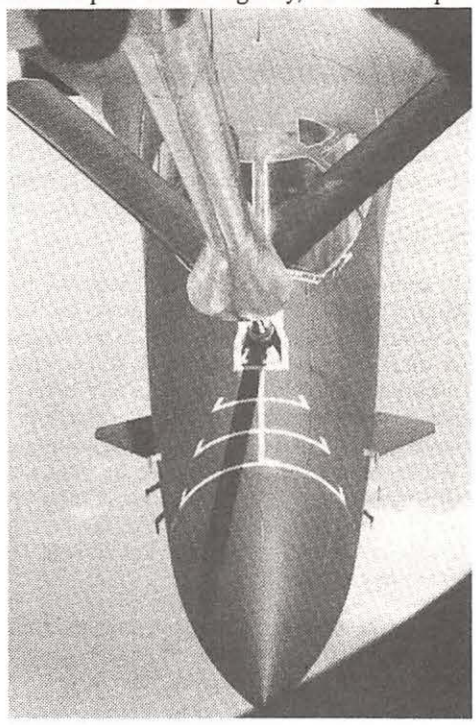
I wasn't quite prepared for the sight that greeted my eyes. The view was astonishing. Below us towering cumulus clouds reached up with vaporous fingers, trying to grab us. The 180 degree view I had from pressing against the window made me feel suspended above the world. There was no airplane holding me up, just me out there alone, in the thin air. Suddenly realizing that the only thing between me and a forty thousand foot drop was a thin sheet of plexiglass made my adrenaline rise. It didn't look real. A carefully painted backdrop from a movie was being rolled out beneath us. I almost forgot what we were up here for.

Dragging me back to that reality was a shape moving up towards us from below. It was the B-1 bomber. The B-1's sleek lines and swept-back wings made it look like a strange giant bat. The bomber grew larger and larger in the window until I thought it could grow no closer. It grew even closer still. Just when I thought that we were about to collide, the bomber's advance stopped. An invisible bow wave of air, being pushed out in front of the bomber, lifted up the tail of the tanker. I could feel the tail rise and my stomach drop. The bomber was approximately 30 feet aft and ten feet below the tanker, filling our windshield. Too close for my comfort.

"Taco," deftly using his hand controllers, flew the refueling probe down toward the nose of the bomber. On the B-1's nose, a little door slid open revealing the fuel receptacle.

White lines painted on the bomber point to the fuel port, helping the boomer guide in the fuel probe. There is an audible clunk, and the pilot of the bomber shouts into his radio, "contact." Thousands of gallons of fuel are now being pumped into the bomber. Both the boomer and the receiver are working hard to keep the probe in position.

We hit a rough spot of choppy air and the probe pops out of the refueling port briefly. Jet fuel spews out and sprays over the nose of the bomber. "Break, break!" the bomber pilot radios urgently, as he is temporarily blinded by the spray. The boom swings up and immediately the bomber drops down. "Sorry about that," Taco radios. Little wipers pop up on the B-1 and clean the frozen fuel off the windshield.



Contact! The white lines painted on the nose of the B-1b help the boomer guide the probe into the fuel receptacle.

The B-1 moves back into position after his windshield clears. The tanker and the bomber hook up again, this time without incident. Below, earth and clouds streak by and in 20 minutes the B-1 takes on its load of fuel. The bomber breaks contact with the boom and drops almost straight down.

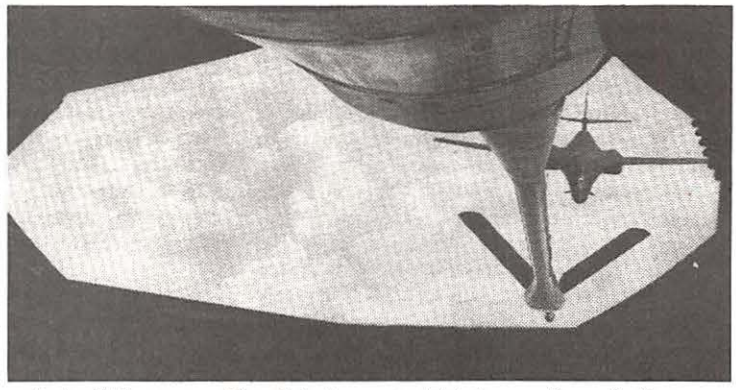
For the first time I can see the full, clean, stealthy design of the B-1b. Although plagued with technical problems, the B-1 promises to be a strong arm of the strategic triad. But until all of the bugs are worked out of the system, every flight of the B-1 is a test flight. New untried systems can bite a bomber crew hard, and shake-down flights like this one can reveal the bugs. But for all its troubles, it is an impressive high-tech design. Luke Skywalker would be envious of its crew.

The swept-wing bomber disappeared quickly and went off on a mission known only to those inside. The boom was flown back into its locked position under the tail. This aerial dance completed, the tanker turns and heads for home.

We finish up our mission back at Altus. The hard granite mountains surrounding the base pass beneath us. As a crowning touch to a successful mission, the pilot decides to shoot a practice "touch and go." I had the privilege of sitting up in the "jump seat" just behind the pilot and co-pilot for an excellent view of our approach. The runway loomed ahead.

Three loud thumps signaled that the landing gear had dropped and locked into place. The end of the skid-marked runway passed just feet below us. The rubber and metal wheels protested with a shrill screech as we made solid contact with the ground. The pilot applied power, the nose rose, and I was thrown back into my seat as we climbed back into the sky.

The plane banked sharply to the left, maneuvering like an agile fighter. A short turn around and we passed over the granite mountains again. We performed an instant replay of our landing without practice emergency take-off. This time we rolled slowly



And off it goes -- The B-1 drops straight down after refueling.

Frequencies

Altus Air Force Base, Oklahoma

Altus Approach	348.3
Altus Metro	255.6
Altus-Blue Steel Command	372.2
Altus MAC	281.4
Altus Primary refueling	359.1
Altus Secondary refueling	260.2
Altus SAC and MAC coordination	266.5

Preset Frequencies in Altus KC-135 Tankers

Channel	Frequency
1	289.4
2	255.6
3	324.3
4	290.9
5	259.3
6	348.3
7	395.9
8	391.9
9	311.0
10	338.6
11	321.0
12	319.8
13	363.1
14	255.4
15	381.3
16	381.3
17	364.2
18	239.8
19	372.2
20	273.5

Preset Frequencies in Dyess AFB B-1b Bombers

Channel	Frequency	Use
1	275.8	Ground
2	295.7	Tower
3	322.3	Departure
4	269.9	Ft. Worth
5	351.1	Mito?
6	372.2	Dispatch
7	385.7	ATIS
8	344.6	Metro
9	311.0	SAC Common
10	255.4	FSS Common
11	321.0	SAC Common
12	235.1	AR 623
13	295.8	AR 114
14	370.4	Tone Check
15	258.2	La Juanta STR.
16	300.6	Chase
17	303.0	Chase
18	379.1	Approach Control
19	338.3	Approach control
20	236.6	TWR Common

towards the alert parking area. We taxied past other tankers on alert, waiting to take off on their missions. We were welcomed by an eager ground crew waiting to service our tanker.

SPAD-One Three's mission was over, but for the other tankers ready to taxi it was just the beginning. I thanked the crew for an exciting look at what they called a routine mission and walked down the stairs onto the tarmac. I was greeted by the hot Oklahoma sun. Overhead, a KC-135 roared into the sky.

mt

Author Steve Douglass sits in the right seat of a B-1b bomber fom Dyess AFB, Abilene, Texas. All photos are by Steve Douglass.

EMERGENCY COMMUNICATIONS NETWORKS

by Jack Metcalf

What if...

Probably more people than you realize have asked questions prefaced with those two words. Ask any number of people what their most frightening "what if" is and you're likely to get the same answer: a nuclear war.

Hopefully, a nuclear war isn't a very likely "what if," but that hasn't stopped some important people from thinking about how to survive one. Let's face it too; there are also a myriad of other "what ifs" that, while not nearly as destructive as a nuclear war, cause people a great deal of concern.

Just what if this nation found itself in the middle of any great crisis? What would you do? Where would you go? You don't want to think about it? Don't worry, someone has already thought about it for you.

Answer: Shortwave

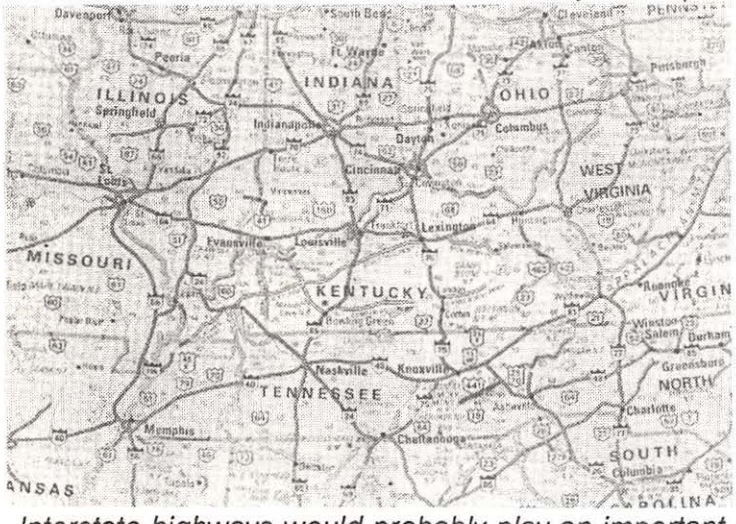
It turns out that some of the answers to those "what ifs" can be found in the shortwave spectrum in the form of Emergency Communications Networks (ECNs).

At some point, most shortwave utility monitors have probably encountered an ECN in action. Whether it's a five letter Morse Code transmission from Federal Emergency Management Agency (FEMA) station WGY912 or amateur radio operators passing critical weather information during a hurricane, ECNs abound across the shortwave spectrum.

Recently, however, three new nets have become active. One is operated by the Federal Highway Administration (FHWA), the second apparently by all U.S. government agencies with High Frequency (HF) capabilities, and the third by Bell Telephone.

Although details are still not complete, these nets nevertheless afford at least a chance to hear some unusual stations and also, some rarely seen (at least from utility stations) data transmission modes. During an actual emergency, these nets would most likely be active with current and probably very important information.

This article will briefly describe activities a utility monitor can expect to hear and speculate on the nature of the nets. A detailed tabulation of all known callsigns, frequencies, and operating modes follows this article. Readers with additional information on any of these nets are encouraged to forward it to the *Monitoring Times*.



Interstate highways would probably play an important role in the FHWA's mass evacuation plans.

The Federal Highway Administration Net

Although the FHWA net has been operational for quite some time (an article in the February 1988 *Monitoring Times* indicated 1985), the earliest logging noted in any publication probably came from a March 1986 exercise. All of the FHWA stations in this net have callsigns beginning with WWJ and the callsign series runs from 40 to 99.

Callsigns of net participants without a WWJ prefix are other Department of Transportation (DOT) stations and one callsign is possibly assigned to the National Coordinating Center at Arlington, Virginia. Officially, this net is known as the FHWA Emergency Communications System (ECS).

Figure 1
Current Frequency Usage

UTC	FREQUENCY	ACTIVITY
1400	F4-9197 kHz	Command Net
1410	F5-10891 kHz	" "
1420	F6-12158 kHz	" "
1430	F5	" "
1500	F4	" " (100 watts)
1510	F5	" " " "
1520	F6	" " " "
1530	F5	" "
1600	F4	" "
1610	F5	" "
1620	F6	" "
1630-1830	Various	Regional Nets
1830-2000	F5	Teletype Training
2000	F4	Command Net
2010	F5	" "
2020	F6	" "
2030	F5	" "
2100	F4	Command Net (100 watts)
2110	F5	" " " "
2120	F6	" " " "
2130	F5	" "
2200	Various	Regional Nets

Operations

Net exercises are held in March, June, September, and December for several days at a time, and usually during daytime FHWA office hours. However, during their December 1987 exercise, some nighttime activities were heard as well. Although precise exercise dates are unknown, the last five (September 1987 to September 1988) have been held in the third, first, first, third, and third full weeks of those months, respectively.

The FHWA uses USB voice transmissions and both 110 and 300 baud ASCII teletype transmissions. Exercise traffic consists of signal checks, roll calls, test message transmission (all in USB voice) and ASCII teletype training.

Operations usually begin with national command net activity on one of the command net frequencies at 1400 UTC. The national command net consists of FHWA headquarters station WWJ40 (national command net control) and the regional net control stations (WWJ41-50). Occasionally, one of the regions may have an alternate station act as regional control during this portion of the exercise.

Signal propagation seems to be a major interest of the command net, with the stations moving from one frequency to another, constantly checking signal quality at each stop. From time to time, the stations will also check communications capability at different power levels, with 100 and 1,000 watts being most commonly used.

There has been a pattern to the frequency movement during the last few exercises, as see in figure 1. For the most part, the regional net activity conducted from 1630 to 1830 UTC and after 2200 UTC is a duplicate of command net activity. You'll hear signal checks, test message transmissions, and some ASCII teletype.

On both the command and regional level, voice test messages are transmitted in roughly the following format:

1. Date/time group
2. Originating location
3. Addressee location
4. Phrase "This is a FHWA test message."
5. Message
6. Repeat of 4

Fig 2: AN ASCII MODE MESSAGE FROM WWJ-45

RTTY MESSAGE NO. 1 FROM WWJ-45
GREETINGS FROM LOVELY DOWNTOWN HOMEWOOD! TODAY WE ARE ENJOYING A COOL BUT PARTLY CLOUDY DAY. CURRENT TEMPERATURE AT THE WORLD'S BUSIEST AIRPORT IS 60 DEGREES F. THIS MESSAGE IS BEING BROUGHT TO YOU FROM THE BUFFER OF OUR MODEL 43. WE RECENTLY LEARNED FROM WWJ75 HOW TO RECALL AND RE-TRANSMIT A MESSAGE FROM THE BUFFER: 1. BUFFER ENTER 2. "RETURN TO RECALL" 3. "STORE" 4. "SND/RDY/SEN". . . . . IF YOU LIKE I WILL TRY TO RECALL AND RE-TRANSMIT THIS MESSAGE.
END OF MESSAGE FROM WWJ-45.....

Station locations can sometimes be obtained from items 2 and 3, but not always. For example, during their March 1988 exercise, station WWJ65 sent a test message to station WWJ44 which indicated the originating location was Frankfort, Kentucky, (and there is a FHWA office there) and the addressee location was Dahlonega, Georgia. The problem: WWJ67 is the call of the Frankfort, Kentucky, station.

In this case, WWJ65 in Raleigh, North Carolina, was relaying a message for WWJ67. Since the stations rarely indicate whether a test message is being relayed or not, it's important to make a check of the callsign list to see if the callsign matches the message's originating location.

Teletype operations during exercises consist of one or two FHWA stations leading a group of stations in a training session. Generally, a station's callsign or a short message, like a local weather forecast, is transmitted. ASCII message format ranges from the casual (Figures 1 and 2) to the more formal (Figure 3). This mode does seem to give the stations some difficulty (300 baud more so than 110 baud), with some stations reporting 100 percent copy while others receive nothing at all. Still, since ASCII is such a rarely seen mode on HF, it is interesting to monitor.

Purpose

Because the FHWA is concerned with any event that could possibly disrupt the nation's highway system, an evacuation of major cities prior to an anticipated nuclear attack would seem to be one of their major concerns. As a matter of fact, the article in the February *Monitoring Times* indicated "the purpose of the FHWA net is to coordinate mass relocation in times of national emergency, either natural disaster or armed aggression."

Based on test messages sent during recent exercises, it's also apparent that the FHWA has a number of other concerns. Messages passed so far have mentioned a possible collapsing dam, a toxic spill in a river, and a region-wide snowstorm.

Some additional scenarios for the use of this net might include a nuclear accident affecting a large area or a large number of people, a major earthquake, and maybe even a hurricane. Monitoring of some of the FHWA frequencies during September's Hurricane Gilbert, however, didn't reveal any activity. Whether the net would actually be used for the type of incident described in Figure 3 is unclear.

The Shares Net

Initially, this net was a real mystery. The arrival of the September 1988 *MT* (page 5), however, helped clear it up. According to the article, the U.S. government has implemented a program to integrate the HF communications capabilities of all federal agencies and departments into a huge network. The code name for this network is "SHARES."

There have been at least two SHARES net exercises, and the number of participating agencies has been impressive. DOT, FAA, FBI, FEMA, and FHWA stations have been heard during the exercises, and voice test message transmissions have indicated that even Veterans Administration (VA), General Services Administration (GSA), Department of Agriculture (USDA), and Immigration and Naturalization Services (INS) stations have participated as well.

Operations

Activities are, for the most part, like those of the FHWA, but with two exceptions. First, no teletype transmissions have been heard, only USB voice test messages. Secondly, when a voice test message is passed, the phrase "This is a SHARES test message" is used rather than "This is a FHWA test message."

Exercise dates are uncertain, but the two previously mentioned exercises occurred in May and December, 1988. SHARES test messages have also been heard during FHWA exercises, but the frequencies used weren't the FHWA's, but rather, USAF MARS!

During the FHWA's March 1988 exercise, DOT station KWB407, which has been an active participant in a number of FHWA exercises, was heard delivering a SHARES test message to USAF MARS station AIR on 13993 kHz. It's also interesting to note that during the SHARES exercises, several FHWA stations participated and delivered, not FHWA, but SHARES test messages!

All of the frequencies and participating stations listed for this net probably won't be active during future SHARES exercises. It's believed the SHARES net will simply make use of existing federal agency frequencies and not have any assigned specifically for SHARES use. As for the exercise participants, since there are twenty-three federal agencies and departments involved in the SHARES program, practically any federal government station with HF capability might show up.

The May and December 1988 exercises illustrate this point perfectly. There were at least ten federal agencies or departments participating, and the majority of the activity took place on DOT, FAA, FHWA, and MARS frequencies.

For the utility monitor, this net can be a gold mine for unusual activity. Where else but a SHARES exercise can you hear an FBI station talking to a DOT station, or an INS station relaying a message to an FAA station.

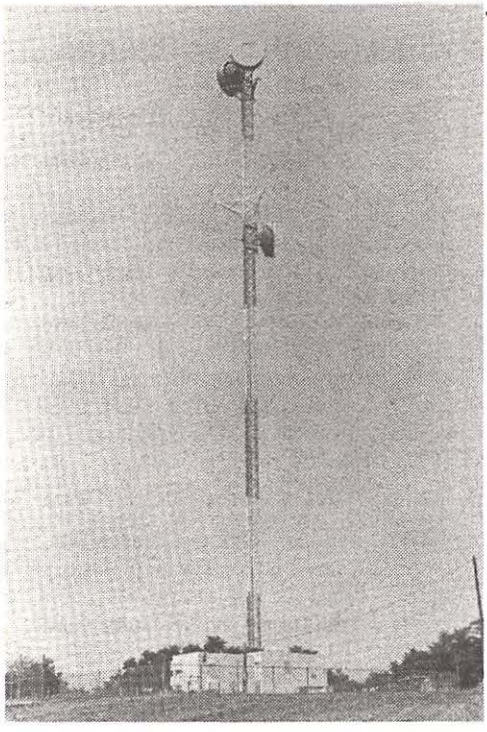
Purpose

Fig 3: ASCII MESSAGE FROM WWJ-82

THIS IS WWJ-82 WWJ-82 WWJ-82
THIS IS AN EXERCISE OF THE FEDERAL HIGHWAY EMERGENCY COMMUNICATIONS SYSTEM. THE QUICK BROWN FOX JUMPED OVER THE LAZY DOG THE QUICK BROWN FOX JUMPED OVER THE LAZY DOG HOW MUCH WOOD COULD A WOODCHUCK CHUCK IF A WOODCHUCK COULD CHUCK WOOD?
END OF MESSAGE FROM WWJ-82

SHARES is an acronym for shared resources. In this case, the sharing is between federal agencies and departments, and the resources are HF networks. Actually, SHARES isn't so much a network in the traditional sense, with set frequencies and callsigns, as it is a framework for federal emergency cooperation.

This system is to be used primarily as a backup in case normal communications fail, but just what type of emergency might cause this net to become operational is highly speculative. Exercise traffic hasn't provided many clues; there have been voice test messages passed with references to a damage survey team, a disaster control manager, and a meeting of recovery leaders, but not much else. Only additional monitoring is likely to



If normal telephone service fails, emergency systems will take to the air.

lead to a full understanding of the capabilities and true purpose of this net.

The Bell Telephone Net

It's only recently been confirmed that this net is operated by Bell Telephone. Confirmation came from a number of sources, including Southwestern Bell Telephone itself.

Mr. Bruce Heald, for example, found that station WNFT417 was licensed to Bell Communications Research (Bellcore) at Morristown, New Jersey, and that a number of other callsigns were licensed to Southwestern Bell Telephone. Don Schimmel, who writes a utility column in *Popular Communications* magazine, found the remaining callsigns were licensed to various Bell companies nationwide. Finally, information received from Southwestern Bell indicated that Bell stations monitored here are participants in Bell's National Security Emergency Preparedness (NSEP) tests.

Actually, it's something of a misnomer to call this the Bell Telephone Net, since there is no longer a single Bell Telephone Company. As a result of the federally ordered breakup of AT&T in 1984, there are now eight independent companies. AT&T provides only long-distance telephone service, while seven regional Bell Companies provide local area telephone service.

Operations

Currently, there are three groups of stations operating here. Southwestern Bell and Bell Atlantic operate regional nets, and Bellcore operates a national net. The Southwestern net involves only the stations in Arkansas, Kansas, Missouri, Oklahoma, and Texas, while the Bell Atlantic net involves only stations in Virginia and West Virginia. The presence of these groups of stations in independent operations suggests the possibility that other Bell regional groupings may also become active on these frequencies.

For quite awhile, the Southwestern Bell stations had a brief Thursday or Friday check-in at either 1500 UTC or 2000 UTC on 7552.1 but activity lately has been somewhat sporadic. WNIM867 in St. Louis, Missouri, is the net control station during this operation.

Southwestern Bell has indicated that both the check-in times and days of operation for this net may change from time to time and indeed, that may be the reason for the recent sporadic activity. Also, due to occasional problems with long range communications on these frequencies during daytime operations, Bell applied to the FCC for additional, higher frequencies. Frequencies in the 18 megaHertz range were approved in late October 1988, but precise assignments aren't yet known.

Bell Atlantic's net only became operational in late September 1988, so details are uncertain. The first check-in occurred on 7552.1 kHz on a Tuesday at 1800 UTC, so that might be a good time to listen. Net control during the first check-in was WNHK761 in Culpepper, Virginia.

The national Bell net meets the last Tuesday of each month on 7552.1 kHz at 1800 UTC (1900 UTC during Standard Time) with Bellcore station UNFT417 in Morristown, New Jersey, handling net control operations.

WNIM867 also participates in the national net, but it is the only Southwestern Bell station to do so. For some reason, though, all of the Bell Atlantic stations have continued participating in the national net.

So far, transmissions have been confined to signal checks, net authentication requests, and net authentication replies. Most communications have been in USB, but the stations in the national net have recently begun using 45, 50, and 110 baud Baudot as well as 110 baud ASCII. Since Southwestern Bell's WNIM867 has been heard using these modes during this net, it's probably safe to assume that the regional nets will use them too. Also, in November 1988, Southern Bell stations WNHU799 and WNID658 were heard attempting 300 baud packet radio transmissions.

The frequencies used by these stations can be found in Bob Grove's *Shortwave Directory* (Fourth Edition, page 150), listed under Industrial Radio Service. During their operations, the stations never refer to frequencies directly, but use channel designators instead. So far, however, this hasn't presented a problem. Just number the Grove list from 11 to 50 and you have Bell's channel plan. It sounds simple, but it's worked so far. The additional frequencies approved by the FCC may make this simple system a little more complex.

Purpose

According to Southwestern Bell, this network has been established for regional or national emergency communications in the event Bell's normal telephone service is disrupted. That's a relatively vague explanation and could include anything from a severe storm to a nuclear attack.

More specifically, since Southwestern Bell is headquartered in St. Louis, Missouri, one of their major concerns is the possibility of an earthquake along the nearby New Madrid Fault. The resulting damage could be devastating to the area's phone system.

These explanations are reflected in the *Shortwave Directory* listing which indicates the frequencies utilized are set aside for "licensees in the Power, Telephone Maintenance, Petroleum, and Special Industrial Services." Since the seven regional Bell companies provide local telephone service to 80 percent of the U.S. population (*Fortune*, June 20, 1988, page 87) it's easy to understand the need for this type of emergency communications capability.

Another clue as to the importance of this net comes from the participation of station KGD34. This station, which has identified itself as the National Coordinating Center in Arlington, Virginia, has been heard in communications not only with stations in the Bell net, but with FHWA stations as well during their exercises. Additionally, KGD34 has been heard working FEMA station KGY908 (Denver, Colorado) on FEMA's F29 frequency (10588 kHz).

Based on the stated purpose of the FHWA net and the known purpose of the FEMA net, it's obvious that the presence of KGD34 in the Bell network signifies these stations have definite national strategic significance.

FIG 4: ASCII MESSAGE FROM WWJ-45

```
DTG: 22 1815 SEP
FROM: WWJ-45
TO ALL STATIONS THIS NET.
MESSAGE CONTAINS 3 PARAGRAPHS
PARA: 1   THIS IS A FHWA/ECS TEST MESSAGE.
PARA: 2   ALERT BULLETIN FOR INDIANAPOLIS IN. --
N.B. I-465 CLOSED TO TRAFFIC AT 46TH STREET.
CLOSURE STARTED AT DTG: 20 1905Z SEP AND WAS
RE-OPENED DTG; 21 0300Z SEP. NATURE OF
INCIDENT: TRUCK/SEMI TRAILER COLLIDED WITH
STATE MAINTENANCE TRUCK AND CAUGHT ON FIRE..
3 INJURIES NO FATALITIES.
PARA: 3   THIS IS A FHWA/ECS TEST MESSAGE
END OF MESSAGE FROM WWWWWWWWWWW
WWWWWWWWWWW      JJJJJJJJJJJ
```

FHWA Emergency Communications System

Region 1/2

WWJ41	Cairo, NY
WWJ42	Providence, RI
WWJ51	Montpelier, VT
WWJ52	Albany, NY
WWJ53	Trenton, NJ

Region 1/2

WWJ54	Concord, NH
WWJ55	Taunton, MA
WWJ56	Augusta, ME
WWJ57	Wethersfield, CT

Region 3

WWJ43	Berkeley Springs WV
WWJ58	Staunton, VA
WWJ59	Montoursville, PA
WWJ60	Beckley, WV
WWJ61	Georgetown, DE
WWJ62	Lavale, MD

Region 4

WWJ44	Dahlonega, GA
WWJ63	Nashville, TN
WWJ64	Orangeburg, SC
WWJ65	Raleigh, NC
WWJ66	Greenwood, MS
WWJ67	Frankfort, KY
WWJ68	Avondale, GA
WWJ69	Defuniak Springs, FL
WWJ70	Montgomery, AL

Region 5

WWJ45	Homewood, IL
WWJ71	Madison, WI
WWJ72	Dundas, OH
WWJ73	St. Paul, MN
WWJ74	Cadillac, MI
WWJ75	Indianapolis, IN
WWJ76	Effingham, IL

Region 6

WWJ46	Ft. Worth, TX
WWJ77	Brownwood, TX
WWJ78	Oklahoma City, OK
WWJ79	Santa Fe, NM
WWJ80	Baton Rouge, LA
WWJ81	Arkadelphia, AR

Region 7

WWJ47	Kansas City, MO
WWJ82	Grand Island, NE
WWJ83	Jefferson City, MO
WWJ84	Topeka, KS
WWJ85	Ames, IA

Region 8

WWJ48	Lakewood, CO
WWJ86	Cheyenne, WY
WWJ87	Cedar City, UT
WWJ88	Pierre, SD
WWJ89	Bismarck, ND
WWJ90	Helena, MT
WWJ91	Denver, CO

Region 9

WWJ49	Petaluma, CA
WWJ92	Redding, CA
WWJ93	Carson City, NV
WWJ94	Phoenix, AZ
WWJ95	Lihue, HI

Region 10

WWJ50	Newport, OR
WWJ50A	Newport, OR (Remote)
WWJ96	Olympia, WA
WWJ97	Salem, OR
WWJ98	Shoshone, ID
WWJ99	Juneau, AK

ADDITIONAL CALLSIGNS

Callsign	Agency	Location
WWJ40	FHWA(HQ)	Washington, DC
Truck No. 2262	FHWA	Mobile Unit
KWB406	DOT	Ames, IA
KWB407	DOT	Durango, CO
KWB408	DOT	Two Rock, CA
KTX20	DOT(HQ?)	Washington, DC
KCP63	FAA	Longmont, CO
KGD34	NCC	Arlington, VA
KKU40	FAA	Kansas City, MO

Transmission Modes

USB Voice
ASCII, 850 Hz Shift, 110 Baud, Reverse Polarity
ASCII, 565 Hz Shift, 300 Baud, Reverse Polarity
ASCII, 850 Hz Shift, 300 Baud, Reverse Polarity
Baudot, 170 Hz Shift, 45 Baud, Reverse Polarity*
Packet, 110 Baud*
Packet, 300 Baud*

Frequencies and Transmission Modes

kHz	FHWA ID	Modes
3199.5	F1	
5255	F2	USB Voice
7419	F3	USB Voice
9197	F4	USB Voice
10891	F5	USB Voice
		ASCII, 850/110R
		ASCII, 850/300R
		Baudot, 170/45R
		Packet, 110 Baud
		Packet, 300 Baud
12158	F6	USB Voice
14461	F7	USB Voice
16211.5	F8	USB Voice
19223	F9	
3304.5	F10	USB Voice
3329.5	F11	
3395	F12	
4572.5	F13	
4821	F14	
4965	F15	
4902	F16	USB Voice
5024.5	F17	
5031	F18	
5330	F19	
5350	F20	
13493	F43	
14953	F44	
15910	F45	USB Voice
15969	F46	
15981	F47	
16330	F48	
17525	F49	USB Voice
18403	F50	
18716	F51	
19934	F52	

kHz	FHWA ID	Modes
5424	F21	USB Voice
5749	F22	
5755.5	F23	
5885	F24	
7669.5	F25	
7726.5	F26	USB Voice
7736	F27	
7743	F28	USB Voice
7821	F29	USB Voice
		ASCII, 565/300R
9169	F30	USB Voice
9185	F31	
9930	F32	
10225	F33	
10918	F34	USB Voice
		ASCII, 850/110R
		ASCII, 850/300R
11045	F35	
11518.7	F36	USB Voice
11605	F37	
12064.5	F38	
12094.5	F39	
12171	F40	
12178.7	F41	USB Voice
13434	F42	
20095	F53	
20330	F54	
20843	F55	
22926	F56	
22975	F57	
24040	F58	
24793	F59	
25490	F60	
26703	F61	
26905	F62	

ADDITIONAL FREQUENCIES IN USE

7540	USB Voice -- USAF MARS (KWB407 w/SHARES message during FHWA exercise)
10588	USB Voice -- FEMA F29 (KGD34 calling WWJ82 during FHWA exercise)
13993	USB Voice -- USAF MARS (KWB407 w/SHARES message during FHWA exercise)

FHWA Command Net

Callsign	Location	Region
WWJ40	Washington, DC	HQ
WWJ41	Cairo, NY	1/2
WWJ43	Berkeley Springs, WV	3
WWJ44	Dahlonega, GA	4
WWJ45	Homewood, IL	5
WWJ46	Ft. Worth, TX	6
WWJ47	Kansas City, MO	7
WWJ48	Lakewood, CO	8
WWJ49	Petaluma, CA	9
WWJ50	Newport, OR	10

Command Net Assigned Frequencies

kHz	FHWA ID	kHz	FHWA ID
3199.5	F1	12158	F6
5255	F2	14461	F7
7419.5	F3	16211.5	F8
9197	F4	19223	F9
10891	F5		

Regional Net Assigned Frequencies

Region	kHz	FHWA ID
1/2	3304.5	F10
	4572.5	F13
	5350	F20
	7669.5	F25
	9196	F30
	10225	F33
4	14461	F7
	3395.5	F12
	4821	F14
	5031	F18
	7726.5	F26
	9930	F32
	10918	F34
	11045	F35
	16330	F48
	18403	F50
6	3329.5	F11
	4572.5	F13
	5749.5	F22
	7669.5	F25
	9197	F4
	11605	F37
	13434	F42
	13493	F43
	15969	F46
	18716	F51
	20095	F53
8	3329.5	F11
	4572.5	F13
	5885	F24
	7669.5	F25
	9169	F30
	10918	F34
	13434	F42
	13493	F43
	16330	F48
	18403	F50
	20330	F54
10	3395.5	F12
	4902	F16
	5031	F18
	7726.5	F26
	9930	F32
	10225	F33
	12094.5	F39
	14953	F44
	15910	F45
	17525	F49
	19934	F52
	20095	F53
	22926	F56
	24793	F59
	25490	F60
	26905	F62

Region	kHz	FHWA ID
3	3329.5	F11
	4965	F15
	5024.5	F17
	7736	F27
	9185	F31
5	3304.5	F10
	4902	F16
	5424	F21
	7821	F29
	9169	F30
	11518.7	F36
	12178.7	F41
	15910	F45
	17525	F49
7	3395.5	F12
	4821	F14
	5755.5	F23
	7743	F28
	9185	F31
	11045	F35
	12178.7	F41
	15981	F47
	17525	F49
	19934	F52
9	12158	F6
	14461	F7
	3304.5	F10
	4965	F15
	5330	F19
	7736	F27
	9930	F32
	11045	F35
	12064.5	F38
	15969	F46
	18403	F50
	20843	F55
	22975	F57
	24040	F58
	24793	F59
	26703	F61

QSL Addresses (prepared form cards only)

WWJ40
Federal Highway Administration
Attn: ECS Manager
400 Seventh Street, S.W.
Washington, DC 20590

WWJ48
Federal Highway Administration
Region 8
555 Zang Street
Lakewood, CO 80228

WWJ65
Federal Highway Administration
P.O. Box 26806
Raleigh, NC 27611

WWJ82
Federal Highway Administration
Dept. of Roads
P.O. Box 94759
Lincoln, NE 68509

WWJ97
Federal Highway Administration
530 NE Center Street
Salem, OR 97301

*Note: The status of these modes for official net operations isn't clear, but WWJ77 and WWJ82 did experiment with them in December, 1988.

DOT Emergency Radio System*

Callsign	Location
KIT88	Martinsburg, WV (DOT Site C)
KTX20	Washington, DC (DOT HQ?)
KWB236	Nashua, NH
KWB238	Harrisonburg, VA
KWB239	Hilliard, FL
KWB240	Rensselaer, IN
KWB405	Bryan, TX
KWB406	Ames, IA
KWB407	Durango, CO
KWB408	Two Rock, CA
KWB409	Ephrata, WA
WSX70	Kenai, AK

Frequencies	DOT ID**
3303	F1
5008	F2
7373.5	F3 (F1)
7582	F4
9074.5	F5 (F2)
11028	F6 (F3)
13432.5	F7
17421	F8
4055	FAA Fixed HF Net
7475	FAA Fixed HF Net
8125	FAA Fixed HF Net

*Note: DOT maintains this separate HF Emergency Radio System. This list is included since some of these stations participate in FHWA and SHARES exercises.

**Note: F numbers are conjectures based on a previously known DOT channel plan. Previous channel designators are enclosed by parenthesis. DOT also has access to three FAA assigned frequencies.

SHARES Net

Callsign	Agency	Location
KMD652	DOT?	Bridgeport, CA?
KWB405	DOT	Bryan, TX
KWB406	DOT	Ames, IA
KWB407	DOT	Durango, CO
KCJ20	FAA	Farmington, NM
KCP63	FAA	Longmont, CO
KDC20	FAA	Salt Lake City, UT
KDM45	FAA	San Juan, Puerto Rico
KDM49	FAA	Atlanta, GA
KDM50	FAA	Hampton, GA
KDM53	FAA	Anchorage, AK
KEM80	FAA	Washington, DC
KIT88	FAA	Martinsburg, WV
KJB96	FAA	Aurora, IL
KJK77	FAA	Palmdale, CA
KJK80	FAA	Leesburg, VA
KJK82	FAA	Jamaica, NY
KKY40	FAA	Kansas City, MO
KLD70	FAA	Nashua, NH
KLN80	FAA	Atlantic City, NJ
KMR96	FAA	Fremont, CA
WHX20	FAA	Seattle, WA
WHX45	FAA	Burlington, MA
N3	FAA	Gulfstream G-159 Aircraft
KIJ44	FBI	Tampa, FL
KKJ67	FBI	Albuquerque, NM
KOG69	FBI	Butte, MT
WGY910	FEMA	Bothell, WA
WWJ46	FHWA	Ft. Worth, TX
WWJ49	FHWA	Petaluma, CA
WWJ70	FHWA	Montgomery, AL
WWJ73	FHWA	St. Paul, MN
WWJ75	FHWA	Indianapolis, IN
WWJ77	FHWA	Brownwood, TX
WWJ82	FHWA	Grand Island, NE

WWJ87	FHWA	Cedar City, UT
WWJ95	FHWA	Lihue, HI
WWJ97	FHWA	Salem, OR
KAD200	INS	Washington, DC
AIR	USAF MARS	Washington, DC
WUG3	US Army COE	Vicksburg, MS
WUI5	US Army COE	Albuquerque, NM
KLC373	USDA?	?
KLC400	USDA?	Carson City, NV
NNNONIG	USN MARS	Pensacola, FL
NNONIV	USN MARS	Asheville, NC
KAZ599	?	?
KME34	?	?

Frequencies and Transmission Modes

kHz	Mode	Agency
7475	USB Voice	FAA
7540	USB Voice	USAF MARS
8125	USB Voice	FAA
10195	USB Voice	?
10891	USB Voice	FHWA
11028	USB Voice	DOT
13630	USB Voice	FAA
13993	USB Voice	USAF MARS
14383.5	USB Voice	USN MARS
16348	USB Voice	FAA

Bell Telephone NSEP Net

Callsign	Company	Location
WNFT417*	Bell Communications Research	Morristown, NJ
WNFT417*	Bell Communications Research	Red Bank, NJ
WNGN547	Indiana Bell	Indianapolis, IN
WNGQ469	New York Telephone	Linlithgo, NY
WNHK760	Chesapeake and Potomac	Staunton, VA
WNHK761	Chesapeake and Potomac	Culpepper, VA
WNHM961	Chesapeake and Potomac	Fairmont, WV
WNHM965	Chesapeake and Potomac	Martinsburg, WV
WNHM969	Chesapeake and Potomac	Beckley, WV
WNHN755	Michigan Bell	Southfield, MI
WNHP857	South Central Bell	Gadsden, AL
WNHU799	Southern Bell Telephone	Atlanta, GA
WNIC425	Illinois Bell	Champaign, IL
WNID658	Southern Bell Telephone	Jacksonville, FL
WNIM867	Southwestern Bell Telephone	St. Louis, MO
WNAX939	?	?
WNIM435	U.S. West Communications	ID
WNKD998	Pacific Bell Telephone	CA
WNKG722	Pacific Bell Telephone	?
WNKR875	Pacific Bell Telephone	?
WNLP942	Pacific Bell Telephone	?
WNME910	?	?

*Note: If Red Bank is active in the net, it uses WNFT417 Red Bank as an ID, and Morristown uses WNFT417 Morristown.

Southwestern Bell Net

Callsign	Company	Location
WNIM867	Southwestern Bell Telephone	St. Louis, MO
WNHI785	Southwestern Bell Telephone	Little Rock, AR
WNHT324	Southwestern Bell Telephone	Oklahoma City, OK
WNID675	Southwestern Bell Telephone	Topeka, KS
WNIY791**	Southwestern Bell Telephone	Houston, TX
WNJK493	Southwestern Bell Telephone	Kansas City, MO

**Note: During September's Hurricane Gilbert, a possible remote or mobile unit with the callsign WNIY791-8 was heard in communications with WNIY791.

Bell Atlantic Net

Callsign	Company	Location
WNHK760	Chesapeake and Potomac	Staunton, VA
WNHK761	Chesapeake and Potomac	Culpepper, VA
WNHM961	Chesapeake and Potomac	Fairmont, WV
WNHM965	Chesapeake and Potomac	Martinsburg, WV
WNHM969	Chesapeake and Potomac	Beckley, WV

Additional Callsigns

Callsign	Agency/Company	Location
KGD34	National Coordinating Center	Arlington, VA
KJL412	Possibly new call for WNGQ469	Linlithgo, NY
KPA525	?	Chicago, IL

Transmission Modes

USB Voice

ASCII, 170 Hz Shift, 110 Baud, Reverse Polarity
Baudot, 170 Hz Shift, 45 Baud, Reverse Polarity
Baudot, 170 Hz Shift, 50 Baud, Reverse Polarity
Baudot, 170 Hz Shift, 75 Baud, Reverse Polarity
Baudot, 170 Hz Shift, 100 Baud, Reverse Polarity
Baudot, 170 Hz Shift, 110 Baud, Reverse Polarity
Baudot, 425 Hz Shift, 45 Baud, Reverse Polarity
Packet, 300 Baud

NSEP Frequencies and Transmission Modes

kHz	Channel	Mode
4610.5	19	USB Voice
5099.1	30	USB Voice
6803.1	34	USB Voice
7549.1	44	USB Voice
		Packet, 300 Baud
7552.1	45	USB Voice
		ASCII, 170/110R
		Baudot, 170/45R
		Baudot, 170/50R
		Baudot, 170/75R
		Baudot, 170/100R
		Baudot, 170/110R
		Baudot, 425/45R
		Packet, 300 Baud
7697.1	50	USB Voice

18 MHz Precise frequencies unknown

Additional HF Assignments***

kHz	
2194	5005
3155	6763
4438	7300

***Note: FCC records indicate Bell is also assigned these frequencies, but it's not known if NSEP operations take place here.

QSL Addresses

WNFT417
Bell Communications Research
435 South Street
Room MRE 1K126
Morristown, NJ 07960

WNIM867
Southwestern Bell Telephone
Attn: Area Manager-NSEP Operations
1010 Pine Street
St. Louis, MO 63101

WNFT417
Bell Communications Research
Attn: WNFT417 Manager, 2X410
331 Newman Springs Road
Red Bank, NJ 07701-5699

SCA: FM Radio's Alter-Ego

The Radio the FCC Doesn't Want You to Own

by Bruce F. Elving, Ph.D

It has been ignored by the consumer press. The high fidelity and stereo industry doesn't talk about it. Certainly, few FM listeners are aware of it. "It" is a medium of communication available free for the taking in almost all parts of North America -- namely, FM subcarrier broadcasting.

First demonstrated in 1953 by FM's inventor, the late Edwin H. Armstrong, multiplexing of more than one program on a single station's carrier was authorized to begin in the United States by the Federal Communications Commission in 1955. Long since eclipsed in the public eye by another multiplexing development, FM stereo, subcarrier FM has been largely the province of special interest groups, instead of the public.

FM-SCA listening has enjoyed a steady growth in the last 30 years, thanks largely to magazine articles showing how to assemble FM subcarrier construction kits and to companies supplying the components and radios to make such listening possible.

Tuning in SCA is no more sinister than owning a police radio, FM stereo, or a color television.

Indeed, the distinction between FM-SCA and FM stereo, both of which can take place on the same FM station, is blurring. Both are "multiplexed" transmissions and both can be enjoyed by the public in large numbers, the difference being that stereo FM is identical to the regular FM program, while SCA FM is [almost always] different from the regular FM station's programming.

Not all FM stations make use of an SCA, but I am sure more would, if the owners had personal access to SCA radios in order to explore the fascinating and often money-making things that can be done with this wonderful medium. SCA can be received as clearly and reliably in the local service area as the regular FM station.

My *FM Atlas and Station Directory* has publicized the existence and nature of SCA programming, and this led to curiosity as to how SCA-FM can be received. This caused us in 1977 to explore the business, legal and technical aspects of SCA tuning-in. In the years since, we've offered SCAdapter devices to the public, as well as conversions of radios to pick up SCA transmissions.

In our early days we fought off several threats of lawsuits from entrenched SCA interests who would like to keep SCA private and out of the public's radios. More recently, the FCC deregulated SCA, allowing more uses of the SCA signal, including data services and freeing stations from having to get specific advance approval before embracing an SCA [Subsidiary Communications Service"].

That term was changed to SCS ["Subcarrier Communications Service"], with this article using the letters SCS or SCA interchangeably. Canada has a similar service called SCMO.

In deregulating the medium, the FCC utilized our data showing the degree of SCA utilization nationally by broadcasters. In so doing, the FCC announced its intent to encourage broadcasters to make greater use of SCA, and it created a new SCS channel, 92 kHz, which enabled broadcasters to make greater use of their station bandwidth.

The two common subcarrier frequencies are thus 67 kHz (the granddaddy of them all), and 92 kHz. One FM station can send out three programs simultaneously -- a stereo program to its regular audience and two separate programs on SCA, such as a radio reading service to the blind at 67 kHz and foreground music at 92 kHz.

Another channel -- 57 kHz -- is in use exclusively for data. Data includes highway condition alertings in many metro areas, and digital paging. It is a channel not favored by at-home listeners, because it is devoid of talk or music programming.

Legalities

Because FM-SCA is a technology which is multiplexed and "readily available" to large numbers of the public, tuning in its transmission is no more sinister than owning and using a police radio, public service band scanner, radar detector, listening to FM stereo, or watching color television. Virtually all laws prohibiting the use of such devices have been struck down by the courts as being in violation of the First Amendment to the Constitution.

Apparently, however, government can control where you can use these devices; such as forbidding the use of scanners in private automobiles. Similarly, you should be able to listen to background music on SCA in the privacy of your home, but not in a business that you own if it might deprive the music company of rental income for equipment to play the music in the store. You enjoy further legal protection if the radio, even though modified with an SCA circuit, is a radio designed primarily to tune in other transmissions (like regular FM and AM), rather than its being designed solely for subcarrier reception.

Anybody questioning the legality of tuning in SCA should contact local broadcasters for a letter of permission authorizing tuning in their subcarriers for noncommercial, hobby purposes. Please send us copies of any such letters you receive from broadcasters.

All FM stations known to have an SCA are listed in the latest edition of the *FM Atlas*; write the author for price and ordering information. The very distinction between who is an "authorized user" and who is a "pirate" is a fine one, and one that even the courts would probably shy away from.

Although at this writing the FCC is unwilling to encourage the use of tunable SCA radios, the FCC noted that the frequencies received by many electronics devices, including scanners, can be used for unprotected communications as well. "Thus, the suggestion that the Commission require that reception of certain frequencies be blocked or filtered is not a practical one."

The FCC pointed out that it is not a guarantor of any electronics privacy protections. It is even legal to eavesdrop on cellular telephones, using commonly-available UHF TV sets in the channels 79-83 range.

SCA or SCS is a valuable and relatively unexploited resource available to the public and to the FM broadcaster alike. Despite the use of better transmitting equipment, some broadcasters still entertain prejudice against SCA, thinking that subcarrier use will somehow compromise the quality of their main channel signal. The FCC has helped by allowing stations to increase their overall modulation to compensate for having an SCA, and there is no evidence that having an SCS will decrease a station's ratings.

The needs of a growing population to be better informed about specialized matters will dictate more uses of SCA, rebounding to the benefit of FM stations and the public alike. By taking SCA "out of the closet," our efforts could result in SCA's being included in every FM radio sold in the United States in the future.

Programming

SCA's programming has considerably broadened since 1977, when most of the use of the medium was background music to stores. Radio reading services to the blind were just getting underway; they are now found in most metropolitan areas, or across entire states, usually on the subcarriers of public stations. Overlapping reading services can be tuned in in such areas as Wichita, Kansas, and along the Minnesota-Wisconsin borders.

It is a pity that most SCA radios are fixed tuned, getting only one station, and not allowing blind citizens who travel or who live in areas having overlapping signals to tune in all that they could. There is ethnic programming in many major markets, at either 67 or 92 kHz. Foreground or light rock music predominate on 92 kHz. Many stations have an easy-listening SCA at 67 kHz. With the demise of easy-listening from many commercial FM stations, SCA remains the only way for millions of people to hear that format on radio.

In certain areas of the country you can tune in religion, medical news, relaying of sports and special events, or even AM stations on SCS. With many AM stations having financial troubles, it might make sense for them to direct their efforts to being on the SCA of a nearby FM station rather than face the prospect of ultimately closing down.

Listeners with radios so equipped could hear the regular FM program, and then flipping a switch, hear an SCA containing their favorite AM station. SCA has a monaural signal with a bandwidth up to 7000 Hz, or about as good as the best AM stations send out. Its benefits include coverage range similar to the main station stereo signal, and the ability to broadcast a whole new program without having to create new transmitters, build new towers, or pay the power bills necessary for running a complete radio station. SCS is truly a piggyback service.

With the FCC concerned about "deregulation," and removing artificial restrictions in broadcasting, the time is ripe for broadcasters and the public alike to turn to FM-SCA. Let its crystal-clear signal peal out with music and information in clear voice -- content that can inform, uplift, extoll, or even upbraid.

To computer activists, SCA offers a world of data, whose unencryption can challenge the most technically adept. Broadcasters, however, know the world of sound, and it is talk and music services which they should consider when addressing SCA opportunities. By offering alternative program-

I Love SCA

Most music is entertainment and is meant to capture and hold your attention. Yet, research has proven that when properly arranged and recorded, music can be used to do just the opposite. It can help people concentrate better on whatever they are doing and reduce the distraction of noise at the same time.

Why should background music be used instead of other sources, such as AM-FM radio? Playing radio's commercials in the workplace does not make good business sense, especially when it's playing competitor's commercials, and could require the nuisance of registration and payment of music license fees. If a tape player is used, it would need time-consuming care in maintenance and cleaning. Tapes must be changed. Music quickly becomes repetitive.

Background music can keep shoppers in a store longer, while "foreground music" is designed to meet the need of businesses wanting a more contemporary sound. Foreground music is usually played at a louder volume and is meant to be consciously listened to.

Inspirational Audio Music by Roy Swafford is a music format designed to create a Christian atmosphere in a business. Most background music services utilize satellites to send the programming to the individual stations, which send them out in turn by FM-SCA or SCS.

An engineer at KHOZ-FM 102.9 Harrison AR is quoted: "Most satellite receivers can receive audio subcarriers like Muzak and it is not illegal to listen to them. It is also legal to purchase an SCA receiver. Yes, you are eliminating the background music companies who charge a fee, but that's only in terms of businesses, not for the private individuals. There is no such law that says 'all must pay a service fee who listen to SCA'."

"My experience with the special programs of music through the FM radio can be found in this poem."

My Musical Friend

Hidden beneath the transistors in my radio,
Is a special program of music called SCA.
There all the time, waiting to be discovered
Like a different world.
Refreshed by an undying melody,
Singing its own songs for me to listen.
Never too busy to put joy in my heart,
Putting a smile on my face,
Restoring life to my soul,
Always glad to please and
Always there like a friend.

(This information on background music comes from an *FM Atlas* reader, David Jackway, Springfield, MO.)

ming, whether for profit or not, they can complement what they are doing with their main channels.

A public station could provide music on its SCA while carrying news-magazine programs on the main channel. A commercial station could offer its regular music format while broadcasting sports on SCA, or vice versa. A rock station could offer its easy-listening or talk formatted AM signal via SCA, especially if the AM has coverage problems, or if located in areas having high concentrations of high-rise buildings with steel construction, making for poor AM reception (but unimpaired FM-SCA reception).

The fact that hundreds of thousands of folks are out there with tunable SCA radios, as is the case in the New York city area alone, should be of little concern to the stations or the SCServices. The public at large may have some curiosity about hearing the reading service station, ethnic programming, medical news, or background music, but this is a transitory interest, far eclipsed by the tunings-in of those to whom such broadcasts are intended. Indeed, this large audience is something that could be programmed to and nurtured.

Third parties can get into the SCAct by approaching the manager of a local FM station with ideas as to how its SCS could be providing a profitable or meritorious service in exchange for a nominal monthly rental to the station. SCStations are free of such FCC restrictions as the equal time requirement in political broadcasting, although ultimately the FM station licensee is responsible to the FCC for the contracts it has with the people to whom it leases an SCA, and for having a general knowledge of the nature of the SCA emanations, including foreign language or what type of data is being sent out to computers, pagers, and similar instruments.

Reading services on SCA get away with audio pornography that would not be tolerated by most stations if it were on a main carrier, and you can pick up private point-to-point messages on SCStations having tone-and-voice paging services.

Being able to tune in SCA at home or on your car radio is absolute elitism!

To the casual listener or would-be SCA broadcaster, the opportunity is there for a new form of electromagnetic discovery. Not only are the programs different, but the reception characteristics differ. Some stations run their SCA only part of the time. Others run different services on the same channel at different times, while still others experiment with it, sometimes turning the signal on seemingly only for the engineer's amusement.

Even trying to find out information from some SCA stations can be far from routine. Not everybody employed at the stations knows that an SCA exists or what it is used for -- and if they know, they may be paranoid about it and not tell you. Yet, it behooves those employed at an FM station to find out about its subcarriers. The SCA may be helping to make the station more profitable, and make possible the paying of your salary.

Listeners should be aware, too, that many a public or religious FM station that may be begging you for funds could be raking in the dollars by offering for-profit data, music, paging or other services -- something they're not very likely to mention, but nevertheless a significant source of income or potential income.

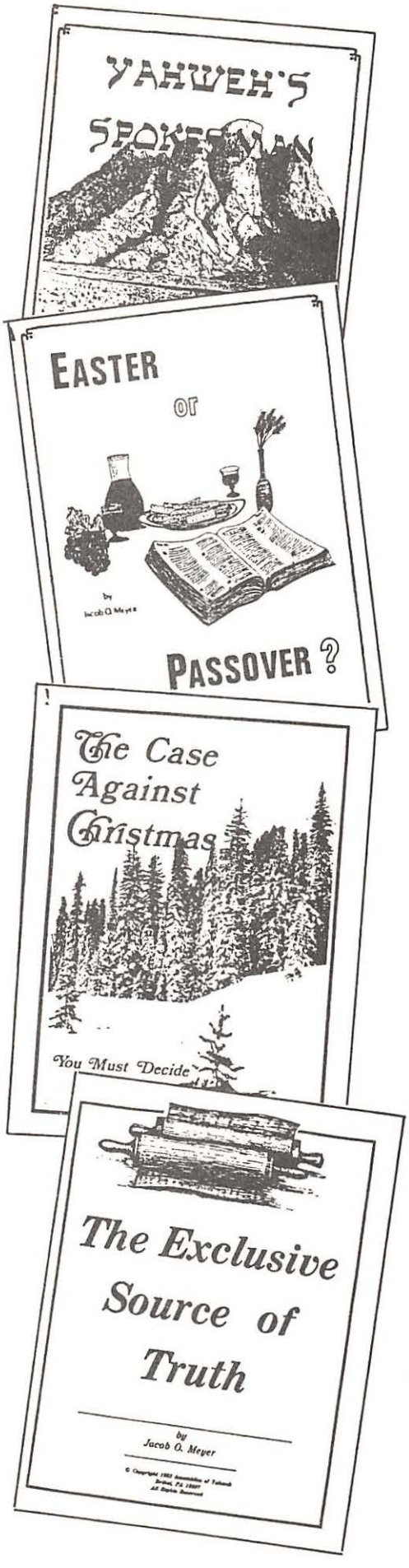
Being able to tune in SCA at home, on a portable, or on a car radio is the absolute elitism in radio listening. You are in a class unlike 99 percent of your neighbors. Considering that SCS is sent out with only 10 percent of the energy that the main FM station uses, reception of SCS under most conditions is surprisingly good and uncritical when the receiving equipment is properly installed and used, although it does suffer from multipath distortion and crosstalk problems.

To get good reception, place your radio in a spot getting a clear signal from the FM station with no multipath interference.

Until the day comes when you can visit your favorite store and buy an FM SCA radio, you may have to use some ingenuity in tuning in SCA. It should be well worth the effort to familiarize yourself with this medium -- and the best way to do so is with your own FM-SCS radio or adapter unit.

mt

Dr. Bruce F. Elving is editor of the FM Atlas and Station Directory and FMedia! Readers may contact the author at Adolph, Minnesota 55701.



Meet Elder Jacob O. Meyer of

WMLK: The Voice of the Assemblies of Yahweh

Many American shortwave listeners have, at one time or another, come across WMLK. Broadcasting from Bethel, Pennsylvania, the station has attracted a great deal of interest -- not so much because of its programs as its history. Based in an abandoned gas station and using a rebuilt AM transmitter to reach the world, WMLK astounded the world by doing what most people said was impossible: getting on the air.

But how many people have stopped to listen to what this courageous little broadcaster has to say? Have you ever wondered what the Assemblies of Yahweh are? What they stand for?

Considering that the station doesn't broadcast to the United States, it's amazing how many eyebrows are raised when the details are revealed of how WMLK came to be on shortwave, where they operate from and what equipment they use. *Monitoring Times*' Dave Kammler talked with the head of the operation, Elder Jacob O. Meyer, about the voice of the Assemblies of Yahweh.

MT: Tell us about WMLK radio.

JM: WMLK is an outgrowth of a radio broadcast I began in 1966. Over the years we've had the radio broadcast on as many as 75 stations all over the world. Currently, I think we're on 21 stations in the Caribbean -- almost every island carries our broadcast. We also have Radio Caroline [the boat-based station in Europe], four stations in the Philippines and about 15 here in the United States, in addition to the WMLK shortwave. We were on Radio Africa but in an economy move I dropped it. WMLK now covers that area.

MT: Where is WMLK located?

JM: The WMLK transmitter site is here in Bethel, Pennsylvania. It's about a mile west of the headquarters building on interstate 78, midway between Allentown and Harrisburg. The antenna towers are immediately adjacent to the highway and are visible to motorists. We have two 120 foot towers with modified log periodic antennas.

MT: When did you start to broadcast on shortwave?

JM: We started testing about 4 years ago in early 1985.

MT: There were some problems back in the beginning, though...

JM: When we started testing we thought we had a good system but things didn't work out. So we had to go back to the drawing board. We discussed our situation with a Penn State Professor of Communications. What he told us was that all we need do was aim the antenna in the direction we wanted the broadcast to go. He also stated that we'll never be certain where the broadcast actually goes. So we aimed the antenna in the direction we wanted it to go and we believe the Almighty will move the signal to where ever He wants it.

MT: I hear you have a home built transmitter.

JM: Actually we prefer to think of it as "custom" built and not really home built. I bought a 50,000 watt AM transmitter and after we moved it here we started to modify it. Two of our technicians started building it up into a shortwave transmitter using what components we had readily available. We eventually had to buy the rest of the parts. They were quite expensive -- we put about $350,000 dollars into it with parts and labor and all. I hadn't expected to spend that much when I first started this project.

MT: What power do you transmit with and do you plan to change it?

JM: We're currently broadcasting with

50,000 watts. But some days when conditions are good we might go up to 60,000 watts. We've contacted the FCC and told them that we'd like to boost power to 125,000 watts. So we're back on the drawing board trying to modify the transmitter again. We will again use the components we have available and then purchase the rest.

MT: Rumor has it that you work out of an old gas station.

JM: It was a service station that was erected here next to highway Route 22. When the new highway was built around 1950 the service station didn't have an access to the highway. During the Eisenhower administration the government purchased the route for the interstate system. This then made it a controlled access situation which made the building obsolete and isolated it from any use. It sat for 30 some years unoccupied and in a state of disrepair. That's how we purchased it. The property consisted of 3 3/4 acres. It is a regular service station building with 2 service bays. It gives us plenty of room for offices, storage or whatever else we need. It has been ideal for what we use it for.

MT: Do you plan to move to a new site in the future or are you content to stay here in Bethel?

JM: For the time being I think we're going to stay here. But we may eventually move.

MT: Do you broadcast in more languages than English?

JM: No, not at the present. I would like to start broadcasting in German, Spanish and French within the next year or so. I can handle the German myself, and several members of the Assemblies of Yahweh can handle the Spanish and French. I would probably use them as spokesmen. If we use English, Spanish, French and German we could cover most of the people of the world. Even if they can't speak the language they might at least be able to understand some of it.

MT: What are the times you broadcast?

JM: We broadcast twice a day, 3 hours in the morning and 3 hours in the evening. During which times we try to reach our primary target areas of the Middle East and Europe. Our first broadcast of the week is from 0400 to 0700 UTC Sunday morning. We broadcast again from 1700 to 2000 UTC Sunday evening. We follow the same broadcast schedule all week long. Our last broadcast is 1700 to 2000 UTC Friday evening.

*All broadcasts are on 9465 kHz, in English and are broadcast to Europe and the Middle East.

SUNDAY	0400-0700	1700-2000
MONDAY	0400-0700	1700-2000
TUESDAY	0400-0700	1700-2000
WEDNESDAY	0400-0700	1700-2000
THURSDAY	0400-0700	1700-2000
FRIDAY	0400-0700	1700-2000
SATURDAY	Off the air	Off the air

MT: How large is the response from your listeners?

JM: We have received many letters and have added several thousand names to our mailing list.

MT: Is this response mostly for QSLs or information on the Assemblies of Yahweh?

JM: Some for QSLs and some for literature. Most of it is for the literature.

MT: Where are a majority of your listeners located?

JM: All over the world. Actually we've been getting a good response from the United States and Canada even though that isn't our objective. We have a number of side lobes coming off our antenna which covers the Caribbean, Canada and the United States quite well. We get a number of interested people writing from South and Central America. We've even received a few letters from Los Angeles, California. I received two letters this morning, one from Winnipeg, Canada, and one from Puerto Rico. Both said the signal was strong and clear, so that would indicate the side lobes.

We have been getting a lot of responses from a Finnish shortwave listener's club. We have received more than 50 letters from this club. Some of them tell us that they only live a half an hour drive from the Russian border. So our messages are getting into Russia. As a matter of fact, at one time there was a jammer signal noted on our broadcast. I guess the Russians were afraid of us. I have heard that there are some areas of Russia that use the name of Yahweh for the God Almighty. There is quite a bit of religion in Russia but it is more covert than overt. Nevertheless, more people are becoming interested than in the past.

We have also had a large response from England, Belgium, Italy and from behind the Iron curtain in Czechoslovakia and Poland. We haven't had much response from the Middle East yet. We have had a very large response from Australia and New Zealand which are outside of our target area. The broadcast seems to be covering the world very well. We've also received letters from some Asian countries, in particular India. Our antenna is aimed at 52 degrees, towards Europe. The signal follows the great circle route and covers most of the land area of the world.

MT: Why did you decide to broadcast on shortwave?

JM: Well, there are countries that you cannot penetrate with a commercial broadcast and we felt the most effective way to preach our message was over shortwave. It goes to all areas of the world and is an uncontrollable signal.

MT: What are your plans for the future of WMLK?

JM: Expansion! We hope to have a 250,000 watt transmitter someday. As time goes on we'll add more languages, more hours and frequencies. We also hope to eventually install a rotating log periodic antenna, but there are many problems with that. We used to use the technicians from WINB, in Red Lion, Pennsylvania. They (WINB) have two antennas over there, of course they have a lot of real estate and a rhombic antenna. But nevertheless we'll probably go to some kind of cross antenna to catch South America and other new areas. We're still studying the situation to see what is best.

MT: Now that your radio waves are heard around the world, can we discuss what message they are carrying? Tell us about the Assemblies of Yahweh?

JM: As I mentioned before, the Assemblies of Yahweh are an outgrowth of a radio broadcast I began in 1966. After studying the holy scriptures very thoroughly I came into a deeper knowledge of Bible truths. The door was open, so I started to preach what I consider important doctrines on the radio.

MT: Tell us about Jacob Meyer. Are you ordained by any religious organization?

JM: No, I'm not affiliated with any other religion. I'm the directing elder of the Assemblies of Yahweh. I have under my direction other elders who preach the message of the Assemblies of Yahweh.

MT: Where did the name of Yahweh come from and what does it mean?

JM: Yahweh is the best transliteration that I've been able to find available for the tetragrammaton (four letters written in the ancient Hebrew text that represent the name of God, which was considered too sacred to say) which is used 6823 times in the Old Testament. It actually appears 7000 times but it is attested 6823 times in the current masortic text. This is the name of the Almighty that appears in the Old Testament and it has been translated as Lord or Jehovah. Jehovah is a hybrid word and should not be used because it mixes the letters of the tetragrammaton with the vowels of the word Adnoia (Lord). Lord is not a name but a title so consequently we want to restore the name of Yahweh.

MT: Is that the main message you are trying to get across?

JM: The main message is the restoration of what I consider to be the truth of the Bible. I'm convinced that the sacred scriptures can be harmonized from Genesis to Revelation without contradictions. But generally I don't think that theologians are doing it. That has been my main thrust in teaching.

I think that Christianity is teaching doctrine that contradicts what the Bible says. There are about 1,200 religious organizations here in the United States, each one claiming to be a separate entity. Consequently many of them have contradicting doctrines. I'm convinced that the Bible doesn't have contradictions and that we can find those differences in doctrine within the sacred scriptures.

We use the Messiah's Hebrew name Yahshus instead of the common J-E-S-U-S. I feel that there is a deeper understanding that must be obtained. For example when you accept the shed blood of the Messiah, 1 Cor. 5:7-8 says: "For indeed Christ, our Passover, was sacrificed for us: Therefore let us keep the feast." We accept the shed blood of the Messiah and yet we keep the law of the Old Testament. In Revelations 12:17 it says "keep the commandments of God (Yahweh) and have the testimony (faith) of Jesus Christ (Yahshus)."

MT: Is there any particular group of people you are trying to reach?

JM: No, I'm just trying to send forth what I consider to be the herald of the coming Kingdom. I'm convinced that we're rapidly approaching the second coming of the Messiah. It has been laid upon my heart to preach this message and whoever responds we'll try to give them further education on what we find in the scriptures. We're proclaiming the message of salvation so that people can apply it if they so choose.

MT: What information is available to the listener or general public?

JM: We publish a statement of doctrine which would be interesting to every reader. We also publish more than 50 reprint articles from our monthly magazine *The Sacred Name Broadcaster*. It's a general readership publication and it's going out to more than 15,000 people in 73 countries. We also publish a membership publication called *The Narrow Way*, it goes out twice a month to the people in many different areas of the world who support the work of the Assemblies of Yahweh with tithes and offerings.

WMLK and Elder Jacob O. Meyer welcome your questions or comments. They can be reached by writing to WMLK, Assemblies of Yahweh, P.O. Box C, Bethel, PA 19501.

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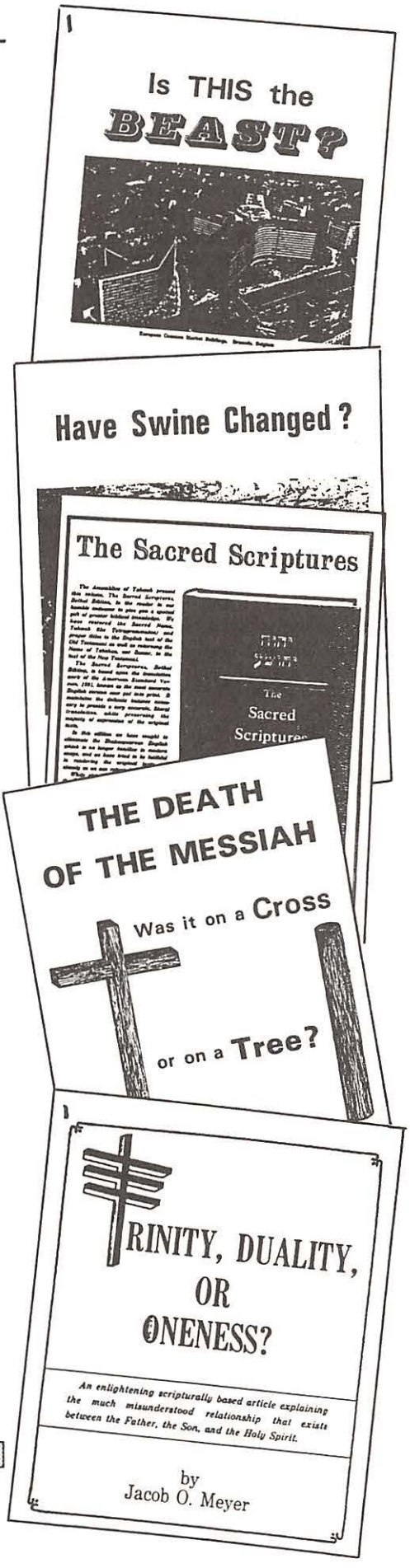


Shortwave Broadcasting

Glenn Hauser
Box 1684 - MT
Enid, OK 73702

ANGOLA Just before the Cuban troop pullout agreement, more broadcasts for them came to light. Better DX them now before it's too late. Radio Carina del Sur is heard Sundays at 0700-0800 UTC on 9565 kHz, from a transmitter in Lubango. Radio Siboney is on 6100 daily at 1800-1900 from South Africa, "la voz del exilio cubano" (Richard Ginbey, RSA, Radio Netherlands *Media Network*)

ARGENTINA The independent sideband feeder from Radio Rivadavia and Radio del Plata is heard all day Sundays on 15780 kHz from 1110, sometimes parallel 9115; 4588 is used Monday-Friday 2100-0200, and for a shorter period on Sunday, unconfirmed Saturday (Tony Jones, Paraguay, North American Shortwave Association "Listeners' Notebook")

AUSTRALIA Time signal station VNG is back for a three month grant ending March 12, on 5000 kHz, a frequency it would rather not use due to interference from and to other such stations, notably WWV and WWVH. A vertical monopole antenna is being used this time instead of a quadrant aerial in November (Dr Marian Leiber, VNG Users Consortium, Radio Australia *Communicator*)

AUSTRIA *Shortwave Panorama* celebrates its twentieth birthday this year, and its one thousandth edition April 2; each week there's a "special attraction." Listen UTC Sunday at 0100 on 9875, UTC Monday 0415 on 6015 (the latter likely to go to a higher band for spring/summer).

BHUTAN The Chief Engineer at BBS says they will begin using a 50 kilowatt transmitter in this month or April. (Sarath Weerakoon, Sri Lanka, *Sweden Calling DXers*) Check 6035 or 9615 kHz until 1400 UTC.

BONAIRE Now that all Soviet and satellite jammers are gone, Radio Nederland should join the civilized world and silence its Bonaire-based "jammers" on 31 meters, 45 kHz above and below 9590 and 9715; terrible buzzing noise from these spurs has obliterated 9545, 9635, 9670, and 9760 for more than a year and sounds exactly like Soviet jamming (Ernie Behr, Ontario, *World of Radio*)

CANADA The Ed Needham Show on CFRX, 6070, Toronto, is one of the best talk shows on the air, and worth listening to; heard weekdays at 2330-0200 UTC. Ed has worked for U.S. networks in the past and owns an Icom R-71A; he invites SWLs to call collect (416-872-1010). (Ernie Behr, Ontario, W.O.R.)

The CBC Northern Quebec Shortwave service includes a number of English programs which may be otherwise inaccessible to you. Times in this item are EST/EDT. Monday-Friday 9-11 a.m., *Morningside*; 6-8 p.m. *The World at Six*, and *As It Happens*; 12-1 a.m. *Night Camp*.

There's more on weekends. Saturday: 9-10 a.m. *The House*; 12-1 p.m. *Quirks & Quarks*; 1-1:30 p.m. *The Media File*; 1:30-2 p.m. *Inside Track*; 10-12 p.m. *Finkleman's 45s*; 12-1 a.m. *Saturday Night Blues*. Sunday: 9 a.m.-noon *Sunday Morning*; 1-1:30 p.m. *Air Farce*; 1:30-3 p.m. *The Entertainers*; 3-4 p.m. *Simply Folk*; 4-5 p.m. *Speaking Volumes*; 10:30-11 p.m. *Vanishing Point*; 11 p.m.-1 a.m. *Jazz Beat*.

Times are approximate; there is usually news on the hour. Frequency usage: 9625 throughout; 6:58-9 a.m. 6065, 9 a.m.-6:30 p.m. 11720, 6:30 p.m.-1:09 a.m. 6195 (via Zack Schindler, MI, *Review of International Broadcasting*)

COSTA RICA Radio for Peace International has informally expanded broadcasting to include Saturday and Sunday at 1800-2400 on 21560; and plans to use its new transmitter experimentally in SSB and even FM, an hour a week on a higher frequency.

CUBA Radio Havana has found an unusual way of dealing with the problem of limited spectrum space. It simply mixes two programs together, as though mixing down a stereo recording into mono, and feeds the result into one transmitter. Both Arabic and English were heard at 1900 on 11800; Spanish and French at 2100. It might have worked if they had assigned each language to a separate sideband (Bill Peek, NC, *DX Listening Digest*)

GUAM AWR-Asia, KSDA, has added a DX program, *DX Asiawaves*, produced in cooperation with the Australian Radio DX Club, Saturday at 1630 on 11980, Sunday 0230 on 17865 and 2330 on 15125. *Micro Snaps* (presumably short for Snapshots of Micronesia) is now scheduled Saturday at 1600 and Sunday at 2300; Mailbox airs Sunday at 0200, 1000, 1615, and 2300. The five English hours start at: 0000 on 15125 (or is the last one in Thai? The schedule is self-contradictory). The 13720 frequency replaces 9465, 9830, and 11700, in use 1000-1700 and 2200-0200 (via Gerry Bishop, FL, RCI *SWL Digest*)

GUYANA Reports for GBC, sometimes active on 5950, should be sent to Mr. Ted Marshall, Technician (P.O. Box 10760, Georgetown). A self-addressed stamped envelope must be used, with at least 150 (units?) of postage for airmail reply. (Kent Willis, Louisville, KY, NASWA *LN*)

HAITI Radio Artibonite heard on 1790 kHz, the second harmonic of 895, at 0110 when the usual utility was gone. (David Crawford, FL, *DX South Florida* via *Radio Nuevo Mundo*). Also heard after 0500, possible extended weekend schedule, Radio Trans-Artibonite on 1789.7. (Terry Krueger, FL, Ibid.)

KAMPUCHEA The overseas service, Radio Voice of the People of Kampuchea recently noted in a letter that they seek reports, remarks, and suggestions from American friends. While this sounds like requests from a number of international services, I think it shows a definite interest in obtaining listener feedback. RVPK is certainly more responsive than its predecessors -- verifying reports, sending out scenic viewcards, and issuing a station pennant. I've suggested to them that they consider a broadcast to North America during the 1330-1500 UTC period beamed 0 to 20 degrees. (Bill Matthews, Columbus, OH, NASWA *LN*)

LIBYA (non) A clandestine run by the Libyan National Movement, Voice of the People, was heard on 11825 in Arabic from 1355 to 1930 but announcing broadcasts at 1100, 1400, and 1800, plus Fridays only at 0800 (BBC Monitoring via NASWA)

NETHERLANDS Radio Netherlands has been asking

listeners in North America if they would like English to be broadcast at different times. Major changes are expected, probably the last Sunday in March, such as an evening broadcast earlier than 0230 UTC, something we suggested long ago as EDT zone listeners have had to stay up until 11:25 p.m. (see also BONAIRE)

NEW ZEALAND Updating info in our October column: An upgraded Radio New Zealand International aims to be on the air in 1990 to coincide with the N.Z. Sesquicentennial. The service would initially broadcast 11 hours per day in morning and evening using a 100 kW transmitter, located southeast of Taupo.

Programs would be in English with limited use of Pacific languages and strong emphasis on news and sports. The operation of the shortwave service would be contracted out to Radio New Zealand, or to a private operator. The setting-up cost would be about NZ$ three million and the annual budget about NZ$ one million. Ten staff would be employed and many programs would be contracted out or made by Pacific Island groups in New Zealand. The first of two 100 kilowatt transmitters will be put into operation in February 1990, in time to cover the Commonwealth Games in Auckland. (Arthur T. Cushen, NZ)

NIGERIA Radio Nigeria, heard at 2228-2245 on 6088.4, not parallel 4770, presumably Kaduna reactivated, nominal 6090. (Kirk Allen, OK, RCI *SWLD*)

PALESTINE (non) Voice of the Revolutionary Council, Sautu Lijani Al-Thauriya, heard continuously 1700-0050 UTC on 15235 and weaker 15450, no location given. (Gregory Clark, Hampton, VA, RCI *SWLD*)

PERU The new one on 4881.7 is Radio Nuevo Mundo, Pucallpa, Ucayali, heard at 1105 (Shuichi Sasaki, Japan, *Radio Nuevo Mundo* [the club]) Operates 24 hours, audible here around 0700-1130, registered with one kilowatt on 4880 as OAZ8H. FM programming relayed on shortwave: Estereo San Martin, 4810.2 at 0630 (Takayuki Inoue, Japan, *Relampago DX* via *RNM*)

PHILIPPINES Some really strange out-of-band frequencies heard in Japan: on 9360.t, Maharlika Broadcasting System at 0945 in English and Tagalog. (Ralph Famularo, *The DX Spread*) No trace of it here (Mitch Sams, KS) On 13256.0, PBS around 0800-0900 in Tagalog with English IDs for 918 kHz. (Nobuyoshi Aio, *DXLD*) Aero transmitter playing around?

SAN MARINO The governments of Italy and this country are negotiating about an international shortwave station with two 100 kW transmitters not only to be used by Adventist World Radio but also for governmental broadcasts. (Marcel Rommerts, Holland, DSWCI *SW News*)

SOUTH AFRICA On an otherwise extremely boring, banal, bland, and uncontroversial New Year's Eve call-in on Radio RSA, *MT* editor Joe Hanlon quoted "sources" (obviously our own report) of Radio One programming, being heard at 2230 during a test on 25790 kHz. The hosts said there is no such program, so perhaps the ID was actually Radio Orion.

TOGO RTT Inter, The Voice of the New Deal (what's that in French?), has English news at 0930-0935 on 7265, and 1935-1947 on 5047. Overall schedule, mostly in French, is 0525-0903 and 1603-2405 on 5047; in between on 7265. (*BBC Monitoring* via NASWA)

UAE Perhaps due to a switching slip-up, a commercial was heard on USE Radio, Dubai, at 0329 in Arabic for the Yum-Yum Corner, the place to go for such American delicacies as pizza, pastries, hamburgers, and ice cream! (Bill Peek, NC, *DXLD*)

UKOGBANI Because of spectrum allocations that come into effect July 1, 1989, BBC will be giving up its long-time out-of-band frequency 18080 kHz, currently used at 0900-1615 UTC. (Bill Dvorak, Madison, WI, *WOR*)

USA World News and Information Radio is a proposed new shortwave station which, unlike all other U.S. outlets, will not be commercial or religious, but public -- carrying programs like NPR's *All Things Considered*. The demise of AFRTS via VOA has prompted this project. If you'd like to bring back balanced reporting of U.S. affairs to the worldwide -- and domestic -- shortwave audience, contact Robert Trobaugh, P.O. Box 7565, Gaithersburg, MD 20898. (ANARC Newsletter)

WSHB (for World Service, Herald Broadcasting -- not WSKB, a typo) planned to begin testing in mid-February, full schedule mid-to-late March. (Radio Netherlands *Media Network*) The projected frequency schedule already appeared in this column last December.

Charles Z. Wick has lost a class-action sex-discrimination suit against VOA, USIA, and USICA. If you are a female denied employment between 1974 and 1984, you may be eligible for a monetary award, and a job now. For details, contact Bruce A. Fredrickson, Webster & Fredrickson, 1819 H St. NW, Suite 300, Washington, DC 20006; 202-659-8515 (newspaper ads via Ed Sirovy, Mike Cooper, R Horvitz, *WOR*)

USSR Koryak Radio is an unusual station, broadcasting only local programs from the Kamchatka Peninsula, Monday-Friday 2015-2100, Saturday 0700-0800, on 4520 kHz. (NHK *DX Corner*, Japan)

A new Soviet outlet on 4795 prompts speculation about its location: Petrozavodsk, says Mikhail P. Timofeyev, Leningrad; Kharkov, says Marcel Rommerts, Holland (DSWCI *SW News*)

VENEZUELA For those who keep track of states heard, the transmitter sit of Radio Capital, 4850, is Los Ruices, Distrito Sucre, Estado de Miranda. (Don Moore, OH, *WOR*)

YEMEN WEST-NORTHWEST Radio Sana'a must have a new transmitter -- heard on three parallels at 0316: 4853.1, 5950, and 9779.3 but 4853 is not used until 2100. (Bob Hill, MA, *DXLD*)

ZAMBIA The only fundamental frequency heard from here is 3345.2 kHz, but harmonics 12330.8 (2 x 6165) and 14730.2 (3 x 4911) are audible. (Vashek Korinek, South Africa, via Al Quaglieri, NASWA *DXtra*)

For lots more news of shortwave and other media, don't miss Glenn Hauser's *World of Radio*, weekly on WRNO, New Orleans: Thursday 1630 UTC (sometimes) on 15420, UTC Friday 0000 on 7355; UTC Saturday 0400 (or later) on 6185; UTC Sunday 0030 on 7355; Sunday 2130 on 15420 (or delayed by ball games -- if after 0000, 7355). All these UTC times switch to one hour earlier when DST starts. A separate DX news report airs on Radio Canada International -- see last month's column for details.

You can also read much more about shortwave in *Review of International Broadcasting* and *DX Listening Digest*. Samples in North America are $2 each, 10-issue subscriptions $21, or both for $40, U.S. funds on a U.S. bank; samples elsewhere US$3 or 7 IRCs each, from Glenn Hauser, Box 1684-MT Enid, OK 73702, USA.

Broadcast Loggings

Let other readers know what you're enjoying.
Send your loggings to ***Gayle Van Horn***
P.O. Box 1088, Gretna, LA 70053-1088

English broadcast unless otherwise noted.

0005 UTC on 4825
Brazil: Radio Cancao Nova. Portuguese. Instrumental accordian music to exuberant ID at 0010 UTC. Listener's phone in music requests. (Rod Pearson, St. Augustine, FL) *Is it true that you're in the running for the ANARC DXer of the year award, Rod? Good luck! --ed.*

0012 UTC on 5030
Costa Rica: Radio Impacto. Spanish. Hit Parade Internacional with top Spanish hits from around the world. "Disco Noticias" news, bank commercial, and numerous "Impacto" IDs. (Harold Frodge, Midland, MI)

0030 UTC on 11715
Mali: Radio Beijing relay. Current Affairs report on billard tournaments. (Bob Fraser, Cohasset, MA)

0054 UTC on 6756
Clandestine: Radio Patria Libre. Spanish. Male announcer with diatribe against Colombian government and "those in Bogota." Portions of music interspersed with reports that this broadcast was to "inform inhabitants in the northern part of our country." Station ID and carrier off at 0105 UTC. (Jim Boehm, San Antonio, TX)

0100 UTC on 6090
Luxembourg: Radio Luxembourg. American pop/rock selections by lady D.J. Station ID at 0130 UTC. (Mark Seiden, Coral Gables, FL)

0105 UTC on 9575
Italy: RAI. News coverage with report on the Marshall Plan 40 years later. (Bob Fraser, Cohasset, MA)

0128 UTC on 4649
Bolivia: Radio Santa Ana. Spanish. Beautiful horn and guitar rhythms to station ID. Haunting solos continued to 0200 UTC. What a musical treat! (Rod Pearson, St. Augustine, FL)

0230 UTC on 11840
Portugal: Radio Portugal. Station ID and news report of the president's state visit to Greece. In depth commentary on the two nations' relations. (Mark Seiden, Coral Gables, FL) Monitored on 15245 kHz at 1620 UTC, and 15250 kHz at 1153 UTC. (Jacques Ahouansou, Abidjan, Republique de Cote D'Ivoire)

0259 UTC on 9580
South Africa: Radio RSA. Amateur Spectrum with feature on amateur satellites and Project Dove headed up in Dearborn, Michigan. Interval signal and station sign-off at 0259 UTC. Monitored on 25790 kHz at 1400 UTC sign-on. (Harold Frodge, Midland, MI)

0305 UTC on 4830
Venezuela: Radio Tachira. Spanish. Sports program with discussion about games between the Coca Cola and Tachira Clubs in Cope Libertador. (Aboe Thaliep, Batang, Central Java) Monitored from 0520-0530 UTC. (Frank Mierzwinski, Mt. Penn, PA)

0310 UTC on 4825
Guatemala: Radio Mam. Spanish. Local marimba music program, and numerous canned IDs with city location. Closing announcements to 0340 UTC sign-off.

0320 UTC on 7110
Ethiopia: Voice of Ethiopia. Amharic. Open carrier observed at tune-in, with interval signal and opening ID. Signal repeated to lady announcer's topics. (Larry Van Horn, Gretna, LA)

0320 UTC on 7200
Somalia: Radio Mogadishu. (Tentative) Somalian. Arabic/Saharan style music and possible ID. Holy Koran recitations, with signal deteriorating rapidly.

0324 UTC on 6215
Pirate: Radio Caroline. Pop music program from the British DJ. Regular Canadian lottery data and local temperature for Brighton. (Harold Frodge, Midland, MI)

0329 UTC on 11835
Uruguay: Radio Espectador. (Tentative) Spanish. Commercials for Kodak camera and Coke, with announcer break at 0330 UTC. (Rod Pearson, St. Augustine, FL)

0337 UTC on 4790
Peru: Radio Atlantida. Spanish. Sports feature with occasional promotional siren, and "Atlantida" ID. (Harold Frodge, Midland, MI)

0340 UTC on 4976
Uganda: Radio Uganda. Native African vocals to "Radio Uganda" at 350 UTC. Fair signal quality monitored four consecutive nights. (Larry Van Horn, Gretna, LA)

0450 UTC on 4850
Venezuela: Radio Capital. Spanish. Brief announcer commentary and Latin vocals. "Radio Capital" ID with city/country location at 0500 sign-off. (Frank Mierzwinski, Mt. Penn, PA)

0511 UTC on 4904
Chad: Radiodiffusion Nationale Tchadienne. French. Native African music with vocals. Extended editorial to highlife music. "Radio Chad" ID at 0530, and recorded speech. (Harold Frodge, Midland, MI) (Frank Mierzwinski, Mt. Penn, PA)

0515 UTC on 6154
Angola: Radio Emissor Regional de Benguela. Portuguese. News relay from Radio Nacional network. Local announcements and clear station ID. Monitored on parallel frequency of 4952 kHz. (Larry Van Horn, Gretna, LA)

0545 UTC on 14802
Kiribati: Radio Kiribati. Open carrier at 0545 tune-in; musical fanfare at 0556 UTC, and station ID. Program highlights and brief musical interlude prior to BBC news relay at 0600 UTC. (Aboe Thaliep, Batang, Central Java)

0600 UTC on 9765
Malta: Voice of the Mediterranean. Religious programming, and panel discussion on Mediterranean music. (Jim Reagan, Mustang, OK) (Fred Carlisle, Tumwater, WA)

0718 UTC on 3990
Liberia: Liberian Broadcasting System (LBS). Programming on crime fighting in Liberia. "Police Report," a public service presentation of the Liberian national police. Station ID, and local Monrovian time check. Abruptly left the air during "Around the Nation" program. Audible on parallel frequency of 6090 kHz. (Jacques Ahouansou, Abidjan, Republique de Cote D'Ivoire) *Terrific log, Jacques!-ed.*

0725 UTC on 7105
Monte Carlo: Trans World Radio. Interval signal followed by sign-on. Station ID, frequency schedule, and religious feature. (Mark Seiden, Coral Gables, FL)

0735 UTC on 9545
Solomon Islands: Solomon Island Broadcasting Corp. (SIBC). Station ID and regional news. Sports roundup, humorous commercial for bottled water, and weather forecast. (Aboe Thaliep, Batang, Central Java) (Harold Frodge, Midland, MI)

0944 UTC on 5040
Venezuela: Radio Maturin. Spanish. Station ID and promotional to musical cumbias. (Harold Frodge, Midland, MI)

0945 UTC on 3286
Indonesia: (Java) Radio Republik Indonesia-Madiun. Indonesian. Local interest news and Family report at 0951 UTC. Lovely orchestra music by Soneta group. (Aboe Thaliep, Batang, Central Java)

0957 UTC on 6065
United States: Alaska-KNLS. Japanese. Open carrier audible until 1000 UTC sign-on. Station ID with programming announcements. Religious music and sermon format. (Larry Van Horn, Gretna, LA)

1000 UTC on 4880
Brazil: Radiodiffusion Arreana. Portuguese. Brazilian pops and sambas. Station ID with frequency quote at 1015 UTC. (Rod Pearson, St. Augustine, FL)

1002 UTC on 5046
Indonesia: (Java) Radio Republik Indonesia-Yogyakarta. Indonesian. Regional news broadcast, sports report, and Keroncong music at 1015 UTC. (Aboe Thaliep, Batang, Central Java)

1005 UTC on 6140
Australia: Australian Broadcasting Corp. (ABC) National news topics of Australia. Stock market report, "ABC Perth" ID, and pop music program. (Larry Van Horn, Gretna, LA)

1013 UTC on 4940
Venezuela: Radio Continental. Spanish. Musical tropicales and "Buenos dias Venezuela, esta es Radio Continental." (Harold Frodge, Midland, MI)

1025 UTC on 9630
Spain: Radio Exterior Espana. Spanish. Music program of Spanish pops. Station ID and cultural report about Madrid. (Rod Pearson, St. Augustine, FL)

1040 UTC on 3395
Ecuador: Radio Zaracay. Spanish. Discussion on the mail system in South America. Excerpts from a speech and station ID. (Harold Frodge, Midland, MI)

1106 UTC on 3360
Guatemala: La Voz de Nahuala. (Tentative) Upbeat campesino music suffering from excessive interference. (Harold Frodge, Midland, MI)

1118 UTC on 6213
Clandestine: Radio Quince de Septiembre. Spanish. ID as "Esta es Radio Quince de Septiembre." Patriotic promotionals and editorial on Nicaragua. (Harold Frodge, Midland, MI)

1130 UTC on 9655
Thailand: Radio Thailand, ID at tune-in with mention of Bangkok. Music instrumentals, news, and pop music program. (Aboe Thaliep, Central Java)

1143 UTC on 3285
Belize: Radio One. Saturday Morning program with English pop music and station IDs. (Harold Frodge, Midland, MI)

1145 UTC on 9580
Australia: Radio Australia. Rock music program beamed to Asia/Pacific service. Top Ten music program to 1154 UTC. Audible on parallel frequencies 9710 and 7215 kHz. (Leslie Edwards, Doylestown, PA) Announced frequency test monitored from 1700-1800 UTC on 15140 kHz, with good signal to 1800 UTC sign-off. (Robert Pietraszek, Turner Falls, MA)

1200 UTC on 4855
Indonesia: (Sumatera) Radio Republik-Palembang. Indonesian. News relay from Jakarta network. Station Commentary to 1215 UTC ID. (Aboe Thaliep, Batang, Central Java)

1200 UTC on 6160
Canada: (Newfoundland) CKZN. Newscast at 1200 UTC. Weak signal with complete fade-out by 1210 UTC. (Robert Brossell, Pewaukee, WI) *Nice log Robert, not reported often.-ed.*

1210 UTC on 4920
Australia: VLM4-Brisbane. Pop music show with commercial announcements, and station ID. Fair signal this morning. (Robert Brossell, Pewaukee, WI)

1244 UTC on 3385
Papua New Guinea: (New Britain) Radio East New Britain. Pidgin. Pop music tunes, followed by religious vocal hymns. Local time checks in English at 1300 UTC. (Harold Frodge, Midland, MI)

1245 UTC on 15605
Pakistan: Radio Pakistan. Arabic. National music to Arabic news topics at 1255 UTC. National anthem and sign-off ID at 1300 UTC. (Jacques Ahouansou, Abidjan, Republique de Cote D'Ivoire) Urdu language audible on 5090 kHz from 0057-0150 fade-out. (Fred Carlisle, Tumwater, WA)

1315 UTC on 15310
Norway: Radio Norway International. Report on the U.N. peace keeping force in Cyprus and Lebanon. (Bob Fraser, Cohasset, MA)

1315 UTC on 9720
Sri Lanka. Sri Lanka Broadcasting Corp. (SLBC) Pop oldies from the Miracles. Country and western to religious hymns and sermon at 1330 UTC. (Harold Frodge, Midland, MI) Audible in English on 11800 kHz from 1835-1910 UTC, with IDs and pop music. (Fred Carlisle, Tumwater, WA)

1530 UTC on 15685
Clandestine: Voice of Unity. Language unknown. Pro-Afghan rebel station with talk and military music. Fair to poor signal. (Robert Brossell, Pewaukee, WI)

1545 UTC on 15240
Sweden: Radio Sweden. News in Brief including a report on Swedish foreign minister's Far East tour. Station ID and frequency schedule. (Jacques Ahouansou, Abidjan, Republique de Cote D'Ivoire)

1545 UTC on 5965
Malaysia: Radio Malaysia. Bahasa Malaysian. Holy Koran recitations to "Inilah Radio Malaysia" ID at 1558 UTC. Pop music program at 1600 with fair signal. (Fred Carlisle, Tumwater, WA)

1600 UTC on 11635
Clandestine: La Voz del CID. Spanish. Political commentaries on Cuba and Castro. Station ID at 1615 UTC. (Robert Brossell, Pewaukee, WI) Audible on parallel frequency 6305 kHz at 1212 UTC. (Harold Frodge, Midland, MI)

1655 UTC on 9852
Equatorial Guinea: Radio Africa. National anthem and station ID at 1658 UTC. Programming announcements and address for listeners in Africa and United States. Religious sermon monitored to signal fade-out at 1730 Utc. (Fred Carlisle, Tumwater, WA)

1731 UTC on 17815
Morocco: Radiodiffusion Televison Marocaine. Arabic/English. Pop music to 1731 UTC. Serial radio drama alternating in Arabic and English. Station ID, and programming schedule. French programming commencing at 1800 UTC. (Harold Frodge, Midland, MI) Noted on 17595 kHz at 1600 UTC. (Robert Brossell, Pewaukee, WI)

1815 UTC on 9560
Jordan: Radio Jordan. Music of the Sixties featuring the Rolling Stones. Brief news summary at 1900 UTC, followed by another hour of music highlighting the career of Van Morrison. (Robert Pietraszek, Turners Falls, MS) Adult contemporary music with IDs, monitored past 2144 UTC. (Jim Boehm, San Antonio, TX)

1830 UTC on 11665
Kuwait: Radio Kuwait. News topics of Jordan and the Palestinians. Continued news of Hungary and Mongolia. (Mark Seiden, Coral Gables, FL) Monitored to 1945 UTC (Bob Fraser, Cohasset, MA)

1935 UTC on 9835
Hungary: Radio Budapest. Poor signal quality throughout broadcast. International news, ID, and news editorial. (Mark Seiden, Coral Gables, FL)

Mr. Alex Commendatore of Nevada received this attractive QSL from Radio Korea in fourteen days!

2028 UTC on 9022
Iran: Voice of Islamic Republic of Iran. (VOIRI) Caught English sign-off at tune-in. Station ID and frequency schedule with Spanish language programming. (Mark Seiden, Coral Gables, FL)

2035 UTC on 9645
Brazil: Radio Bandeirantes. Portuguese. Commercial messages after station ID mentioning "Radio Bandeirantes," amid poor reception. (Jacques Ahouansou, Abidjan, Republique de Cote D'Ivoire)

2100 UTC on 17830
United States: World Harvest Radio (WHRI). Station ID and QSL information with station address, frequency schedule, and programming details. Fair signal quality for religious feature. (Jacques Ahouansou, Abidjan, Republique de Cote D'Ivoire)

2141 UTC on 9901
Egypt: radio Cairo. Closing news bits and station ID. Excellent signal strength, however, distorted audio present. Stamp Collector's Show at 2155 UTC. (Stephen Price, Conemaugh, PA) Audible at 0200 UTC on 9475 kHz, with IDs and Egyptian music. Mark Seiden, Coral Gables, FL)

2150 UTC on 3970
Cameroon: Radio Buea. French/English. Fair signal with minimal interference. Native African and highlife music to ID at 2200 UTC. (Rod Pearson, St. Augustine, FL)

2215 UTC on 5020
Niger: La Voix du Sahel. French. African and English pop styple music. Station ID as "La Voix du Sahel" at 2221 UTC. Choral National anthem, ID, and sign-off at 2302 UTC. (Harold Frodge, Midland, MI)

2220 UTC on 15185
United States: WINB. Religious programming audible under Radio France International. Station ID heard at 2230 UTC. (Robert Pietrazek, Turners Falls, MA)

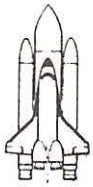
2257 UTC on 11605
Israel: KOL. Discussion of women in government. ID at 2258 UTC, into Yiddish programming at 2300 UTC. (Cliff Goodlet, Chattanooga, TN) Monitored at 0010 UTC on 9435 kHz with "Spectrum" show. Repeated at 0210 UTC. (Robert Pietraszek, Turners Falls, MA)

2301 UTC on 4870
Benin: Radiodiffusion Du Benin. French. Staff editorial and musical variety of reggae and French country and western tunes. National anthem, ID, and sign-off at 2301 UTC. (Harold Frodge, Midland, MI)

2301 UTC on 17558
Iceland: Iceland State Broadcasting Service (ISBS). Icelandic. Gong tones at 2301 UTC and musical note melody. Announcer duo with conversation, and children's chorus. International news topics and friendly chat from ladies. Repeat of musical note melody and sign-off at 2320 UTC. Excellent reception with clear and concise quality. (Leslie Edwards, Doylestown, PA)

2340 UTC on 9840
Vietnam: Voice of Vietnam. Lady announcer with international news. Feature discussion on oil exploration in Vietnam. Station ID with VOA interference. (Fred Carlisle, Tumwater, WA)

Utility World



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Soviet Space Shuttle

The launch of the long-awaited Soviet Space Shuttle from the Cosmodrome Tyuratam in Central Russia has provided monitors with a mixed bag of listening opportunities. The jury, it seems, is still out as far as direct monitored frequencies from the Buran ("Snowstorm") goes. But *Monitoring Times* readers Sam Ricks and Tom Roach did catch the Soviet ship SESS net on HF frequencies.

Sam reported that he and Tom were able to locate and monitor two tracking ship CW/RTTY nets during the preparations for and the launch of "Buran."

Tracking ships in the North Atlantic, South Atlantic, Caribbean Sea, and South Pacific oceans utilized two groups of CW frequencies to manage the flow of RTTY traffic from ship to ship. Active after 0300 UTC were the 8 MHz marine channels, 8417 and 8418 kHz in the CW mode. During daylight and early evening hours, 16836 and 16837 kHz CW were active.

The Akademik Sergei Korolev (UISZ) and the Kosmonaut Vladimir Komarov (UUVO) would initiate a call up of other tracking ships on the CW frequencies and assign vacant RTTY channels for specific vessels to monitor. Both the Korolev and the Komarov were in the North Atlantic.

The RTTY traffic consisted of orbital data, political speeches, news, plaintext traffic, and kriptogrammas. Much of the data concerned the on-going MIR space station mission. Also, there were indications that other objects in low earth orbit at the same inclination as previous launches from Tyuratam were being tracked. Obviously, the potential for a collision with these objects and Buran while enroute to orbit was of concern to the Soviets.

Interestingly, the unique five character kriptogrammas relayed from Moscow and Science One (Nauka Odin) may be another indication of the military aspects of Soviet manned space missions. While monitoring the daytime CW networks, Sam came across CMU-697, the Soviet naval radio station at Santiago, Cuba, on an adjacent 16835 kHz. This duplex coastal station frequency was transmitting a five character CW version of the tracking ship kriptogrammas.

Tom Roach came across a Soviet naval callsign on the civilian tracking ship CW nets. Sam monitored CMU-967 passing CW traffic to the same callsign the night before. Santiago, Cuba, is also the site of a laser tracking and satellite observation post.

Post launch reports in the Soviet press indicated that the Soviet Navy's tracking ship Marshall Nedelin was positioned off the west coast of South America along with the civilian space research ship Kosmonaut G. Dobrovolskiy. They were tentatively able to identify the Nedelin's callsign as RMLP. Sam also found six other similar callsigns active with CMU-967: RMBF, RMOV, RMTP, RMCL, RMEF, and RMFI. Unfortunately, Soviet Naval callsigns are not listed with the ITU, therefore Sam and Tom could not identify these vessels.

CMU-967 was active almost around the clock on 16835 kHz prior to the Buran launch with numerous call-ups every hour. Just prior to the scheduled 0300 UTC Buran launch, 16837 kHz CW and 16697.5 kHz RTTY at 2230 UTC were quite active with the civilian tracking ships. However, with the exception of a quick call-up on the night CW frequency, the tracking nets were silent during this historic launch.

The Kosmonaut Pavel Belyayev (UTDX) off Cape Verde Islands, the Kosmonaut Georgi Dobrovolski (UZZV) 1500 miles south of Easter Island, and the Kosmonaut Vladislav Volkov off Togo appeared to be the three civilian tracking ships active for the Buran's first launch.

Sam also reported that the Russians were also watching the recent launching of the U.S. Space Shuttle Atlantis on a secret DOD mission. The Soviet Academy of Sciences' 5300 ton tracking ship Borovichi moved east of its normal Gulf of Mexico position to a spot between Jamaica and Haiti to monitor the Soyuz link-up with MIR about a week before the Atlantis launch.

Right after the MIR link-up, the Borovichi headed east past Hispaniola and Puerto Rico in the general direction of Antigua. Antigua is the site of a downrange NASA radar tracking station for shuttle launches. If the shuttle was launched on an eastern trajectory, Borovichi would be right on top of the Atlantis ground track. As it turned out, the Atlantis was launched toward the northeast to launch the Lacrosse radar recon satellite. Atlantis was launched into an orbit inclined 57 degrees.

If not for this side trip to apparently monitor the launch of Atlantis, the Borovichi was headed for its home port of Tallinn. As it turned out, the ship's next stop was Paramaribo, Suriname, for additional fuel to make the Atlantic crossing.

Instead of burning up all this fuel on their Caribbean cruise, they could have gone home and read all about the Atlantis mission in the pages of *Aviation Week and Space Technology* magazine -- better known in the aerospace industry as *Aviation Leak*.

I would like to thank Sam Ricks and Tom Roach for presenting this aspect of coverage on the first launch of the Soviet Shuttle Buran.

Shuttle Atlantis Roars Into Orbit

MT readers and astronomers tracked the recent -- and supposedly secret -- mission of the space shuttle Atlantis.

Several readers reported listening in on cockpit conversations. Although NASA and the Air Force said that shuttle communications could only be heard on secure C-band channels, the UHF channels listed in a September 1988 *Monitoring Times* article were also active.

And while officials would not comment on the shuttle's payload, amateur astronomers, linked by computers and headed by Ted Molczan in Toronto, watched and took photos as the the astronauts deployed the giant Lacrosse radar satellite. The satellite was launched on the first day of the four day mission.

Aviation Week and Space Technology published a photo that appears to show the Atlantis orbiter and the Lacrosse satellite flying in tandem about a mile apart. The photograph was taken by an amateur astronomer in Denver, Colorado. Air Force officials refused to confirm or deny *Av Week*'s account of the mission, saying details of the flight remained classified.

One Air Force official did tell *Monitoring Times* that all radio broadcasts on classified Defense Department missions are supposed to be encrypted and that sending radio traffic "in the clear" is a breach of established practice.

Clearly Heard

Although NASA and the Department of Defense withheld

Navy HICOM Channels
Table 1

Frequencies guarded by the USN have been identified as available for emergency use by merchant ships. You will hear navy ships using alphanumeric tactical callsigns.

AREA	CONTROL STATION	FREQUENCY/TIME	
WESTPAC	NAVCOMMSTA PI	12761	2200-1000 UTC
	San Miguel Phillipines		
	NAVCAMS WESTPAC	4040	24 hours
	Guam	4813.5	24 hours
EAST/NORTH	NAVCOMMSTA UK	6720	2200-0600 UTC
LANT	Thurso, Scotland	11255	0600-2200 UTC
(CinCUSNavEur)			
LANT/CARIB	Various	6697	24 hours
(CinCLantFlt)		11267	24 hours
		23287	24 hours
CARIB	COMNAVFORCARIB	7535	24 hours
	NAVSTA Gitmo Bay	15522	24 hours
INDIAN OCEAN	NAVCAMS WESTPAC	7535	0200-1300 UTC
	Guam	12213.5	1300-0200 UTC

NAVY HICOM NETS (24 HOUR GUARD)

	EASTERN/MIDPAC	WESTPAC	INDIAN OCEAN
	(COM3RDFLT)	(COM7THFLT)	
PRIMARY	4416	6720	12215
SECONDARY	8778	11255	23315
TERTIARY	13181	18009	

launch communications from the public for security reasons, those communications were easily monitored by our readers up and down the east coast of North America.

During the ascent, the orbiter transmitted on both S-band and published UHF frequencies to ensure maximum communications in the event of an emergency. The UHF frequencies were not encrypted, and NASA officials said they realized launch communications could be monitored freely.

"Houston, we have MECO (main engine cutoff) on time," radioed Astronaut Robert Gibson. The vehicle at this point was flying at about 60 nautical miles altitude at a velocity of about 25,725 feet per second.

UHF transmissions also showed the crew acknowledging a call from mission control that the vehicle's orbital velocity required no initial burn of the OMS (Orbital Maneuvering System) engines. This indicated that Atlantis used "a direct ascent" trajectory that required no OMS burn until about 45 minutes into the flight.

Av Week also reported a previously undisclosed problem with the flight. When the five astronauts launched the 500 million dollar recon satellite, its massive solar panels at first failed to deploy.

Atlantis astronauts were prepared to conduct a spacewalk to free up the panels. These panels unfurl to a wingspan of 150 feet. A second radio command by Air Force tracking stations was eventually able to break the panels loose.

I would like to thank all those *MT* readers who provided information that made this feature possible and remind our newer readers to this column that a complete profile on the U.S. space shuttle's communication system can be found in the editor's book *Communication Satellites*, available from Grove Enterprises.

• Navy HICOM Net

A great network to monitor for U.S. Navy activity are the fleet HICOM nets. These nets were established many years ago in response to an international incident involving a Navy ship. It was discovered that in case of emergency, ships had no common frequencies that are monitored continuously by shore stations worldwide to establish priority communications.

Since then these HICOM frequencies have been expanded in their mission to include broadcast of SAC-type foxtrot broadcasts. Table 1 lists a complete set and schedule of the known HICOM channels.

Mr. UK over in the British Isles files the following report on U.S. Navy frequency activity he is hearing on his side of the Atlantic. This should give you an idea of the type of activity that is heard on HICOM channels.

11255 [HICOM] (Very busy) This frequency seems to be used as a general channel to verify many other circuits in use and QSL times of traffic sent via these circuits. Stations heard on this channel include communication stations (COMSTAs) Nea Makri, Greece; Rota, Spain; Keflavik, Iceland; Sigonella, Italy; plus many ships and some P-3 aircraft.

11267 [HICOM] Similar in activity to 11255 but not as busy. Most of the COMSTAs are stateside. VQ-4 TACAMO aircraft are frequently heard on this channel. All traffic uses NATO tri-graph identifiers.

23287 [HICOM] Only recently has this frequency come into use. The frequency stays quite busy. COMSTA Keflavik heard on this frequency.

8972 [Safety of Flight channel] North Atlantic Anti-submarine network. Other active channels include 6720 and 6697 -- both of these are HICOMs -- and 11205. 11205 is interesting and looks like a possible new frequency to keep an eye on.

Thanks for the great update, Mr. UK, and we all look forward to future contributions.

• TAC Channels in the NE US

An *MT* reader who wishes to remain anonymous would like to pass on the following frequencies that have been heard recently in the northeast portion of the United States. I would like to thank this reader for sharing these interesting channels with our readers.

4400.8	USCG Special Patrol Operations
7626.0	USCG Special Patrol Operations
8169.0	USCG Special Patrol Operations
8196.4	USCG Special Operations
6500.0	USCG Helo Air-to-air chit-chat
5704.0	USAF Night time channel
13214.0	USAF Loring AFB GCCS channel days
9023.0	NORAD "Delta" daytime primary
11214.0	NORAD "Charlie 6" daytime secondary
10194.0	NORAD Alternate
10452.0	NORAD Alternate
11264.0	NORAD Alternate
14364.0	NORAD Alternate
18027.0	NORAD Alternate
6687.0	USMC Special Convoys
4560.0	Halifax Military (Canada) night channel
5850.0	Halifax Military (Canada) night channel
17992.0	German Air Force channel "Whiskey Whiskey Whiskey"
13248.0	German Air Force channel "Mike Romeo Lima-17"
4462.0	Canadian Fisheries Patrol Boat "Cygnus" and Ops Control
20876.3	MIT Observatory, MA (LSB mode)
13286.0	WARDAIR Toronto Operations
5645.0	Ship-to-shore High Seas frequency
5266.0	Ship-to-shore High Seas frequency
8170.0	Ship-to-shore High Seas frequency
4535.0	Ship-to-shore High Seas frequency
2506.0	Portland, Maine Marine operator
2613.0	KAC Woods Hole Center, MA to NOAA ships

Now on to the logs from the Utility World...

Utility Loggings

Abbreviations used in this column

All times UTC, frequencies in kilohertz. All voice transmissions are English unless otherwise noted.

AM	Amplitude modulation	ISB	Independent sideband
ARQ	SITOR	LSB	Lower sideband
CW	Morse code	RTTY	Radioteletype
FAX	Facsimile	UNID	Unidentified
FEC	Forward error correction	USB	Upper sideband
ID	Identification		

2182.0 CGC Hamilton working NMF-CG COMSTA Boston in USB at 0018 for a signal check. (Bill Battles, E. Kingston, NH)

2678.0 Scrambled Coast Guard voice communications heard at 0712 in USB. This frequency normally used by CG Districts 7,9, and 17. (Michaer Comer, Titusville, FL) Welcome to the column, Mike. Looking forward to hearing from you often.

2694.0 CG Station Jonesport, Maine, working CG Group Southwest Harbor, Maine, in USB at 0026. Also heard Mike 5 Whiskey (CG HH-3F Helo) working CG group Southwest Harbor in USB at 1726 in reference to a diver rescue. (Battles)

2670.0 FV Enterprise working NMF-2 Woods Hole, Massachusetts, talking about a UHF beacon being dropped from CG 2121. In USB at 1726. (Battles)

3023.0 NMF-2 USCG Group Woods Hole, Massachusetts, working the CGC Vigorous in USB at 1357. (Battles)

3113.0 Protazoa working Tentacle with Venu 5 traffic in USB at 0519. (SAC Bravo Uniform). (Battles)

3253.0 USCGC Cape Higgon working CG Group Portland, Maine, in USB at 0109. Both units then went into DVP scrambling. (Battles)

4125.0 USN Tactical Operations (XAC, 6 Papa, etc) in communications with each other in USB at 0506 (another strange one). (Battles) What was strange about it, Bill? -ed.

4171.4 UJHX-Soviet stern trawler/sealer Professor Sergei Dorofeyev heard with traffic and weather for Murmansk Radio at 0232 UTC in CW. The ship was off Gibraltar. (Sam Ricks, Philadelphia, PA)

4374.0 Mike O Alpha calling any station this net for a frequency check at 2331 in USB with no reply. (Comer)

4416.0 US Navy Pacific frequency with Alpha 4 Oscar, Zulu 8 Whiskey, and Romeo 9 Victor conducting radio checks at 0720 in USB. (Comer)

4465.0 Unknown stations using digital voice scrambling in USB at 0042. (Battles)

4675.0 New Zealand 18 heard in USB at 0737 working Iceland Radio with a position report over 65 north/40 west (Reykjavik FIR). (Garie Halstead, Saint Albans, WV)

4742.0 Architect heard in USB given Ascot 7666 a selcal check at 0832 in USB. (Comer) Architct working Ascot 3454 with a selcal check at 0329 in USB. (Battles) Royal Air Force Strike Command channel in the UK-ed.

5167.0 NRK-Keflavik, Iceland Naval COMSTA heard at 0723 with a CW weather broadcast, steady but weak signal. (Jim Boehm, San Antonio, TX)

5421.4 NRQW-USCGC Sweetgum sending a position and operations report to NMG-CG COMSTA New Orleans at 0321 UTC using RTTY 170/75R. (Ricks)

5526.0 Pan American "Clipper 440" heard in USB at 0644 working Maiquetia with a position report over Canaima and estimate for LODIR with Cabo Codera next. Asked for clearance Cabo Codera direct Cabo Rojo. (Usual Rio to Miami flight). (Halstead)

5535.0 British Airways "Speedbird 262" heard in USB at 0700 working Speedbird London with an estimated time of arrival and passenger count (299). They advised that they had a spillage in the rear cargo area of a clear syrup-like liquid from a container marked "food stuff."

5550.0 MAC 59413 working New York Radio in USB at 0817. Gave a position report over TALLO and an estimate for GEJAY. TOOMS was next. New York advised them to contact Miami Center on VHF 132.3 at GREJAY. (Halstead)

5598.0 Zambia 009 heard at 0608 in USB working Santa Marie with a position report over ULTEM (Santa Marie-Sal FIR boundary) then gave an estimate for GAMBA. (Halstead)

5616.0 Canadian 60 heard around 0901 in USB working Shanwick with a 20 degree west report. The pilot gave the wind as 290 degrees at 165 knots (That's really blowing). (Halstead)

5680.0 USCG group Moriches, New York, working FV Biprod in reference to a distress call in USB at 1801. (Battles)

5696.0 Coast Guard COMSTA Miami working Coast Guard Kingston, Jamaica, in USB at 0521. Also heard CG 3502 (anyone know what that is?) working Miami in USB at 1522. (Battles)

6100.0 YVTO-Caglgal Naval Time Station, Venezuela, heard at 0918 with the usual time ticks and Spanish announcements. (Fred Carlisle, Tumwater, WA) Long time no hear, Fred. Welcome back to the Utility World logging section --ed.

6268.4 ULFP-Soviet Oceanographic research ship Akademik Nikolai Andreev heard sending Russian traffic to URD Leningrad Radio at 0138 UTC using RTTY 170/50. The Akademik Krylov class research vessel was built in 1986. The ship was enroute to Santa Kruz, Cuba. (Ricks)

6421.4 NODV-USCGC Spar monitored with traffic to NMF-CG COMSTA Boston at 2115 UTC using RTTY 175/75R. (Ricks)

6577.0 Speedbird 274 monitored at 0813 in USB working New York radio with a position report over MOFFEY and an estimate for HENCH (Overflying the Bermuda FIR enroute to London). (Halstead)

6683.0 Roxy 46 working Albrook GCCS at 0134 in USB. (Battles)

6697.0 1 Hotel Victor calling 5 Kilo Lima for a radio check -- signals were weak and readable. These units had British accents and noted at 0829 in USB. (Comer) Must have been some Royal Navy ships in the Lnat or Carib on exercises. --ed.

6715.0 Andrews (Andy) AFB, Maryland, working SAM 86971 in USB. Moved to LSB at 0731 due to RTTY interference. Ran phone patches to SAM Command Post and Crown. (Comer) Mystic Star channel. --ed.

6729.4 Broadband working Electric (NEACP aircraft). Electric was sending data to the ground station. The ground station did not copy the data from Electric. Noted in LSB at 0605. (Anonymous)

6756.0 Custom working Andrews AFB in USB at 0040. Had to move off the frequency due to a strong Spanish broadcast station interfering. Also heard Air Force One working Andy with a phone patch to Crown stating that they were departing Newark in USB at 2110. SAM 86974 with the Secretary of State aboard working Andrews in USB at 0000. The Secretary of State wanted NATO to have the paper ready upon arrival. (Battles)

6761.0 Electric calling Allowance for a phone patch to Auxillary. (SAC channel Quebec). (Anonymous)

7504.5 GXH-Thurso, Scotland Naval COMSTA heard at 0741 with a CW weather broadcast. Fair Signal. (Boehm)

7652.0 KKN44-Department of State Radio, Monrovia, Liberia, with the usual computer marker suddenly interrupted with manual keying. "QRA QRA DE KKN44 KKN44 QSX 18/23K." The channel then went dead for eight minutes and at 0816 resumed the usual computer generated stuff. (Boehm)

7704.0 AOK-Rota, Spain Naval COMSTA heard with CW multi/marker and a Hydrolant QRU at 0827. Good signal. (Boehm)

8101.0 Powerkit and WAR-46 heard on SAC Alpha Papa in USB at 1535. (Battles)

8418.0 UYZM-Soviet fish carrier Kazis Preykshas off the coast of Labrador with traffic for Klaipeda Radio at 0232 UTC in CW. (Ricks)

8424.0 UBSZ-Soviet research ship Yuzh Morgeologiya heard at 0231 with traffic for an unid Soviet coastal station in CW. The ship, a Akademik A. Sidorenko class geological survey research vessel, was enroute to Mexico. (Ricks)

8842.0 Aeroflot 342, aircraft gave registration as 86518 heard in CW at 0028 with a position report for COL in Havana. Gave departure time for Havana as 2323 and estimate for Shannon as 0740. COL asks in Russian, "QSP PSE PRICHINU ZADERVKI REJSA." (Please relay the reason for your flight's delay.) 342 replies, "ZADERVKI HET, ZADERVKI HET. (No delay, no delay). PO RASPISANIE. (On schedule). SMOTRITE

RASPISANIE. (Review my schedule).* COL then relays it to RFNV in Moscow adding at the end of the report "according to new schedule". (Halstead)

8843.0 Delta 24 heard in USB at 0534 working Honolulu with a position report over CLURE and gave an estimated time for CITTA (Airway R465). Advised 33 north/130 west was the next reporting position. (Halstead)

8855.0 Air France 230 heard in USB at 0134 working Piarco advising he was on the ground at Martinique and had been awaiting clearance to Orly for 20 minutes. (Halstead)

8861.0 Varig 106B using USB at 0726 working Dakar with a position report over ONOBI (Dakar-Sal FIR boundary). (Halstead)

8894.0 Zimbabwe 124 heard in USB working Niamey at 0600 with a position report over KIRMI and an estimate for Djanet (KIRMI located on the Niger/Algerian border FIR boundary). The aircraft was making a trip from Normal Harare to London (Gatwick). (Halstead)

8903.0 Lufthansa 571 heard using USB at 2337 working Accra and Luanda with a position report over 8 degrees 30 minutes south and 00 degrees 31 minutes west. Gave aircraft registration as DABYZ. (Halstead)

8964.0 MAC 60182 (C-141) making a phone patch to Letterman (Hickam Metro) through Hickam GCCS, HI in USB at 0901. (Comer)

Agar 18 working Loring GCCS with a phone patch to Bangor OTH. Said the test was setup on 21.899 MHz. I tuned to that frequency only to hear a Buzz Saw sound three second burst every 30 seconds. OTH is Over the Horizon radar. At 1606 in USB. (Battles)

8964.8 Architect calling 5 Whiskey India for radio check with no reply from 5 Whiskey India in USB at 0849. (Comer)

8972.0 7 Kilo Whiskey working aircraft Hurdy Gurdy 712. Requested they switch to secondary voice channel. Noted in USB at 0742. (Comer)

8993.0 Heard in USB at 1609-Gull 23 making a phone patch to Miami Monitor via MacDill GCCS. Gull 23 was inbound from a tropical storm recon mission. (Comer)

9023.0 Backburner calling Dragnet Victor in USB at 1824. (NORAD) (Battles)

10780.0 1 Foxtrot Juliet calling DOD Cape for a radio check. Noted no reply at 2129 in USB. (Comer)

11035.0 Andrews working an unid aircraft enroute to Nuremberg in USB at 2227. (Battles)

11055.0 Air Force One working Andy in USB at 2110. Also heard SAM 31682 using this channel to Andy. Also heard a phone patch in progress from some unknown units talking about some islands being chemically active, but advising there was no red glow showing. At 0012 in USB. (Battles) Fascinating, Bill. I wonder where that was and who was doing the talking. Must have been some big government bigwig as this is a Mystic Star channel. Nice intercept-ed.

11214.0 Century 62 working Trenton (NORAD) with phone patch to Raymond 24 in USB at 2027. (Battles)

11396.0 N84PH heard working New York radio with an estimate for CHAMP. The aircraft was enroute to St. Thomas via Amber 300. Guyana 716 was also heard working New York with a position report over ROLEY and estimate for LOPPS with Bermuda next. (Halstead)

11407.0 Andrews working SAM 60203 and SAM 60202 in USB at 1958 and 2009 respectively. (Battles)

11414.0 Aria 1 (also Agar 91) working Cape Radio in USB at 1514. (Battles)

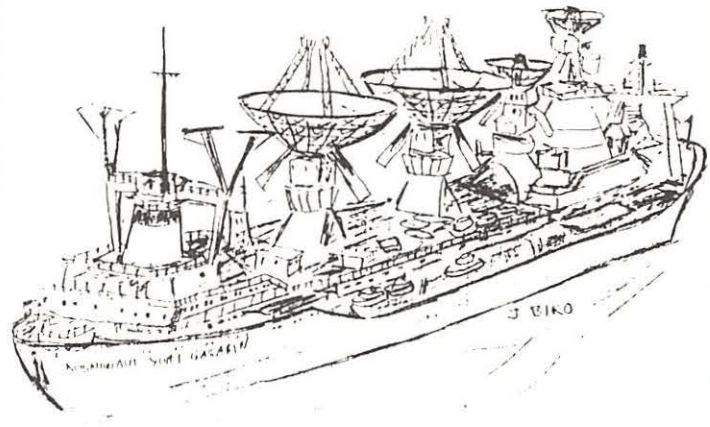
12510.9 UVAU-Soviet spaceflight tracking ship Borovichi giving position and operations reports to Havana Radio CLJ at 1534 UTC using 170/50 RTTY. The ship was 42 miles south of Puerto Rico. (Ricks)

12521.9 UJFO-Soviet Hydromet weathership Professor Multanovsky heard sending traffic for URD-Leningrad Radio at 0739 UTC using RTTY 170/50. (Ricks)

13211.0 Sunbath, Dogfood, and Divinity passing traffic between each other in USB at 0024. (SAC Bravo Whisky channel). (Comer)

13207.0 Century 52 working Trenton military with a phone patch to Kelly AFB requesting "Bingo Times" from Kelly to Tinker in USB at 1932. (Battles)

13211.0 Evolution working Dandy Dan and Bell Run at 1917 in USB. (Conversation was interrupted by a phone patch from a Kenya Airways aircraft via Portishead Radio). Also heard Portishead on 11306 at 1924. (Battles)



Soviet tracking ship CW/RTTY nets were heard before and during the launch of the Soviet space shuttle - Sketch by John Biro

Powerkit working Rainfall on Bravo Whiskey (SAC) in USB at 1513. They all went to Alpha Juliett, can anyone help with this frequency. (Battles) Bill, it is probably one of the floaters from my June 1988 SAC list. I have seen that desig before but never on the same frequency. --ed.

13485.9 NHKW-USCGC Confidence (WMEC-619) enroute to Port Canaveral getting traffic from NMG-CG COMSTA New Orleans at 2138 UTC. They were using RTTY 170/75R. (Ricks)

14955.0 Powerkit working Rainfall and Surfside on SAC channel Charlie in USB 1521. (Battles)

15920.0 CFH-Halifax Military heard with a CW V marker at 2145. Strong signal. (Gregory Dome, San Antonio, TX) Nice to have you aboard the column, Greg. Also nice to see another DXer from Gayle's and my home town of San Antonio. Please report often. --ed.

16701.8 UWNV-A Soviet RORO container ship M/V Inzhener Machulshiy with English traffic for CLJ-Havana Radio at 1515 UTC using RTTY 170/50. The ship was entering the Caribbean Sea from the Panama Canal enroute to Havana, Cuba. (Ricks)

16702.9 UISZ-Soviet spaceflight tracking ship Akademik Sergei Korolev sending ship-to-ship kriptogrammas to UVAU-Borovichi at 1658 UTC using RTTY 170/50. (Ricks)

16703.4 EREU-Soviet hydromet weather ship Ernst Krenkel sending weather reports for Soviet ships at 1645 UTC. Also heard were the hydromet ships ERES-Victor Bugayev, ERET-Georgiy Ushakov, and UZGH-Passat. All these ships were using RTTY 170/70. (Ricks)

16707.0 UMDL-Soviet supertanker (88,700 tons) Kuzbass reporting position and weather observations to EREU NISP E. Krenkel at 1712 in CW. The ship was south of the Azores headed west. This channel is used by Soviet ships to report weather observations to the Hydromet ships in the Atlantic. NISP Krenkel answers back on 12607 in CW. These weather observations later appear on aviation weather RTTY stations such as CFH-Halifax, Nova Scotia. 16707//12607 operate daily after 1700 usually for 30 minutes. Very active. (Ricks)

18046.0 Ragtime working Net Loss in USB at 2301. (SAC Juliet channel). (Battles)

20192.0 Shuttle mission control audio during the secret military mission of Atlantis monitored here in LSB at 2123. (Battles) So much for government secrecy, Bill. Looks like that flight was "business-as-usual" in regards to communications. The only difference was no public release of audio (networks, WA3NAN, etc.). --ed.

22463.9 UFB-Odessa Radio monitored with urgent English traffic for UTYZ-Kremenchug at 1437 using RTTY 170/50. (Ricks)

Many thanks to all the great contributors of logs and feature material this month.

The Scanning Report

Bob Kay
P.O. Box 173
Prospect Park, PA 19076

Inside the Soviet Embassy

Like most of you, I've been watching Mikhail S. Gorbachev very closely. Mr. Gorbachev wants everyone in the U.S. to believe that the Soviet Union has changed. "Everything is open," he seems to be saying. "Come, look inside!" I took Mr. Gorbachev up on his offer. I knocked very loudly on the door of the Soviet Embassy in Washington, D.C.. But no one answered.

At this point, I must tell you that I did not physically stand at the gate of the embassy. I did my long-distance knocking with a pen. I wrote them a letter asking for permission to tour the building. And I received no response.

Back to the Drawing Board

I wrote to my congressman, Curt Weldon, and asked him if he could help me in obtaining a tour/interview with someone in the Soviet Embassy. Weldon is a member of the House Armed Services Committee and has been closely following the developments on eavesdropping problems at the U.S. Embassy in Moscow. I figured if anyone could get me in the Soviet Embassy, it would be Congressman Weldon. The Soviets, however, denied his request for an interview or tour of the embassy.

I'm not really surprised. Inviting a member of the *Monitoring Times* staff into the Soviet Embassy would be akin to letting a fox loose in the hen house. Imagine the *MT* Scanning Columnist walking around inside the Soviet Embassy with a frequency counter, its digital display going berserk.

According to reliable sources, some of the most extensive Signals Intelligence Activities (SIGINT) in all of the United States take place at the Soviet Embassy. The embassy also provides safe harbor for at least a dozen technicians and linguists who spend their time searching the airwaves of our capitol for signals of interest.

The log periodic antenna there is actually used for HF diplomatic communications. Other antennas, contained within several plywood shacks on the roof, have more sinister purposes. Still other antennas of this ilk are hidden within the attic of the French roof and on the upper floors. Even the chimney contains an antenna that is used for intelligence gathering purposes.

Everything's Game

Voice communications are not the only signals targeted by the Soviets. The embassy contains high tech equipment that can capture radar, telemetry, and microwave signals. The embassy also contains infrared and laser equipment that can accurately monitor the conversations taking place in an office by measuring the vibrations that the voice makes on a pane of window glass!

For unexpected visits by members of the Congress or Senate, the Soviets have installed several secret compartments on the second floor of the embassy. Although some of these are quite small, it is reported that others are large enough to accommodate several large pieces of eavesdropping equipment -- or several KGB agents.

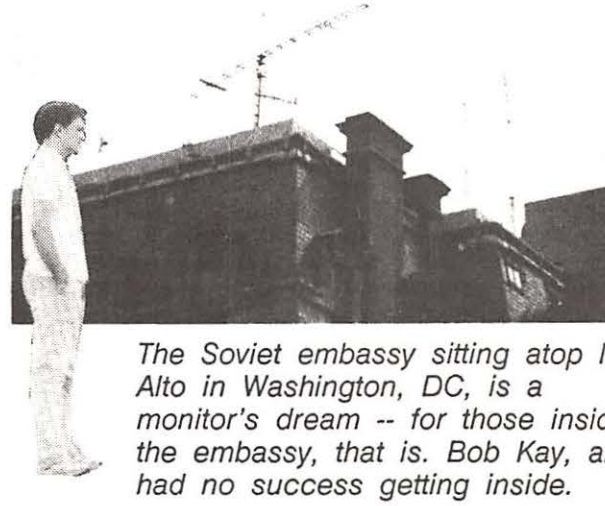
When KGB technicians in Washington get bored, they can travel to their very own recreational area on the eastern shore of Maryland. This R&R area is conveniently located to intercept north-south microwave telephone links along the east coast. Its proximity to the Norfolk Navy Base and Patuxent River Naval Air Station is no accident.

The Soviet UN mission and residences in the New York City area also have extensive monitoring facilities. Further, the upper floor of the Soviet consulate in San Francisco contains two rectangular-section parabolic dishes, one of which points squarely at the Silicon Valley!

Soviet SIGINT activities are not limited to diplomatic missions. KGB agents frequently carry out espionage against U.S. communications from their commercial interest offices, such as the TASS news agency bureau and Aeroflot airline offices.

Aeroflot airliners that fly over or near the U.S. often have covert photographic and SIGINT packages installed. Although impractical for sustained collection against U.S. targets, the SIGINT systems often provide useful RF survey information to assist Soviet planners to prepare for future covert listening missions.

SIGINT coverage is also provided by Soviet "trawlers." Most, if not all, Soviet merchant ships have at least limited SIGINT capabilities. Every time a Soviet ship pulls into port, it's a sure bet that they have their "ears" on.



The Soviet embassy sitting atop Mt. Alto in Washington, DC, is a monitor's dream -- for those inside the embassy, that is. Bob Kay, alas, had no success getting inside.

Soviet trawlers are frequently seen off the U.S. coast. You can guarantee they are monitoring, too, but at higher risk -- They have no diplomatic immunity. (A.W. Edwards)

Agents and technicians working from these locations are not protected by diplomatic immunity. As a result, these listening operations are even more sensitive than those carried out from diplomatic posts. Soviet agents that are caught engaging in this type of intelligence gathering, outside of diplomatic missions, will use any means possible, including deadly force, to avoid being captured.

Of course, everyone knows that virtually every nation spies on other countries through covert activities. However, it's very hard for me to appreciate KGB agents monitoring the White House from behind embassy doors.

Mikhail Gorbachev and the country that he represents are the enemy. Nothing can change that, at least not in my mind. The Soviet Embassy, which is practically located in the backyard of the White House, is proof positive that the open door of glasnost is nothing more than a cleverly set trap.

Readers of this column who may be outraged to learn that the Soviets are monitoring our Nation's Capitol, should write directly to their Congressman. Simply make a copy of this column, send it to your congressman and ask him what he intends to do about the Soviet monitoring activity in Washington D.C.. Address your envelope as follows: Congress of the United States, House of Representatives, Washington, DC. 20515.

Cordless Frequencies

Eric Barber of Chicago, Illinois, wrote and asked for cordless telephone frequencies. Eric just purchased a new scanner and he was having difficulty monitoring cordless phones. Cordless phones operate on the following frequencies:

46.61/49.67	46.63/49.845	46.67/49.86
46.71/49.77	46.73/49.87	46.77/49.83
46.83/49.89	46.87/49.93	46.93/49.99
46.97/49.97		

Since cordless frequencies can vary from one manufacturer to the next, many cordless enthusiasts prefer to search the cordless bands between 46.6 to 50.0 and 49.6 to 50.0 MHz.

The Cordless Phone Antenna

Sure, I know it's still cold and windy out, but spring is just around the corner. In about a month, most of us will be out on the roof, checking on the antenna farm. So here's a neat and easy cordless antenna that everyone can build for just pennies.

The idea came to me when I was talking to Rocky Adams, K3PAQ, from Morton, Pennsylvania. Rocky told me that nothing performs like an antenna that has been specifically cut to resonate on one particular band. Rocky's method of tabulating the correct length is used by radio amateurs across the country. Simply divide the frequency that you want to monitor into 468. The sum of the two is the correct antenna length required to operate on that frequency.

Dividing the cordless band of 46.0 into 468 gave me an antenna length of ten feet. I used copper braided wire from Radio Shack and soldered the center feed from my coax directly to it. To the outside braid of the coax, I soldered a random length (about 15 feet) of the same copper wire.

A waterproof housing for the soldered joints was provided by placing the exposed connections in an empty aspirin bottle and then filling the same with auto body filler. After the filler hardened, (about ten minutes) the plastic bottle was cut away to reveal an inexpensive antenna with a completely watertight connection.

The antenna was mounted outside of a second floor window. A length of fishing line was tied to the top of the ten feet of copper wire and it was pulled up and tied off at the third floor window. The random length of ground wire was just thrown across the roof and allowed to dangle over the edge of the shingles.

The antenna's performance was excellent. On the cordless bands it outperformed my base antenna that is mounted above the surrounding tree tops. Very often, distant cordless conversations would be stepped on by stronger signals that were closer to home. Overall, the antenna performed well throughout the VHF high and low bands. If you want additional information on this inexpensive cordless performer, simply include an SASE with your request.

Military Air is Hot

Mike Dillon lives just outside of Omaha, Nebraska, which is home to Offutt Air Force Base. Although Mike has just begun to scan the military air frequencies, he would like to pass on the following frequencies: 311.0 as the SAC primary channel, and 312 as the secondary channel. Mike also found 149.5 to be active as the SAC Wing Commanders network. Mike promises to share more of his confirmed frequencies with *MT* readers in the near future.

AR900 PRICE CORRECTION

Last month's announcement Grove Enterprises was now carrying the improved AR900 scanner was accompanied by a typographical error in pricing. The correct price is $275 plus $5 UPS shipping. We apologize for any inconvenience caused by this error.

Civilian Air Remains Interesting

Here are the air frequencies for Door County, Wisconsin, and vicinity:

DOOR COUNTY

119.5	Cherryland Airport Approach
119.250	Departure
122.8	Washington Island

GREEN BAY COUNTY

119.4	Austin-Straubel Airport Approach
132.450	Departure
118.7	Tower
121.9	Ground
124.1	Terminal
123.0	Unicom
122.550	Flight Service
123.3	Executive Air, Inc.

These frequencies were provided by Greg C. Diltz of Sister Bay, Wisconsin. Greg would also like to share the following new 800 MHz frequencies being used at Lambeau Field, located in Green Bay, Wisconsin. Grey claims that these frequencies came from a Motorola technician working on the system.

856.2125/811.2125 -- Simplex
857.2125/ "
858.2125/ "
859.2125 "
860.2125 "

Officials of the Florida Department of Transportation recently sent a $5,000.00 bill to an accident victim. The driver of the vehicle, who FDT officials labeled "careless," ran down one of the state's roadside call boxes. Call boxes are actually pole-mounted transmitters that are activated by motorists in time of emergency. Beside a transmitter, each unit contains a solar battery, an antenna, a call selector and other hardware.

Northeast Scanning News' "Sammy the Scanner"

Scanning the Boondocks

Imagine living in a place called "Iron Mountain," Michigan. At first, it would seem that scanning in such a remote location would be anything but exciting. However, Calvin Baird lives there and he sent in a two page list of frequencies that he has logged on three scanner radios. Here's a portion of his list"

42.58	State Police, Base to mobile	
42.68	State Police, Base to base	
42.74	Mobile to Base	
151.655	Ski Patrol	
153.03	Local Well Driller	
153.065, 153.275, 153.345		Loggers
148.55, 149.325, 150.325		KI,Sawyer AFB
163.375	VA Hospital	

If you are interested in the complete list please send an SASE and $1 to PO Box 173, Prospect Park, PA 19076.

Club Health

In the December issue of the *American Scannergram*, (50 Villa Road, Springfield, Ohio 45503) the editor of "Special Topics," Mark Lucas, did a rather interesting column on low power, 49.0 MHz transmitters. Mark pointed out that cordless phones and baby monitors are not the only users of the 49 MHz band. Radio Shack and a company called Maxon are manufacturing FM headsets that have the ability to travel over a half mile.

Mark further stated that the warehouse supervisors at the Radio Shack distribution center in Columbus, Ohio, use just such a system. Other users of low power headlets might include any of the following: dock workers, forklift operators, street vendors and, of course, the kids in the neighborhood.

To check out the action in your own community, simply search between 49.0 and 50 MHz. If you monitor something that's interesting, be sure to pass along the info to Mark and I so that we can share it with our readers.

PRO 2004 Newsletter

Created and edited by Jerry Callam, the first issue of the PRO-2004 newsletter is circulating among scanner enthusiasts. Jerry begins the newsletter by listing some of the various magazines that have mentioned the PRO-2004, including the July and August, 1988, issues of *Monitoring Times*. The two page newsletter also mentions the most popular 2004 diode modifications and gives the addresses of places that provide complete kits.

According to Jerry, a lot of military receivers are using some of the main components that are found in the PRO-2004. Since most military gear can be interfaced with computers, Jerry is trying to determine if the PRO-2004 can be modified to do the same.

The newsletter is free to anyone for the asking. Just send an SASE to Jerry Callam, P.O. Box 502, Mount Vernon, Ohio 43050.

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R71A This is our best seller. ICOM R71A has all the features one expects in a world class receiver. All mode AM, SSB, CW, RTTY, FM (OPT). Complete coverage .1 to 30 MHz. 3 Filter positions, direct keyboard entry. 32 memory channels, PLL tuning in 10 Hz steps for exact frequency. Many ICOM options plus EEB high performance package. (CALL)

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R7000 There is nothing to compare with the R7000 under $12,000. This is the most sophisticated V/UHF receiver ever offered to the public. No wonder its our best selling V/UHF receiver. All mode AM, SSB, CW, FMW, FMN - 25 to 2000 MHz (20 kHz to 2 GHz w/NOVEX FC7100), direct keyboard entry, 99 memory channels, full scan, memory scan, program scan, priority scan, many ICOM options plus EEB options and high performance package deal. (CALL)

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R5000 **$849.95** + $10 UPS

The **KENWOOD R2000** is an innovative all-mode receiver with a host of features to enhance the excitement of listening to stations around the world. 150 kHz to 30 MHz. 10 memories. AM, FM, SSB, CW. VHF 118-174 MHz opt VC10.

R2000 **$649.95** + $10 UPS

A high-class, general coverage receiver with expandability looking to the future. The **NRD-525** will change your shack into a new universe! 0.09 MHz to 34 MHz. Pass band shift. 200 memories. Direct keyboard entry. AM, FM, CW, SSB, RTTY, SSB. Notch filter. V/UHF converter option.

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The **Satellit 650 International** is the ultimate in German crafted portable radios. Along with excellent audio performance the Satellit 650 also has many fine features. 510 kHz to 29.999 MHz. 24 nour clock/calendar. 3 Bandwidths. 60 Memories. AM, FM, SSB, CW. Keyboard Entry. PLL Control. Nicad Battery Option.

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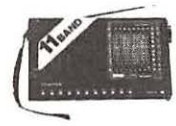

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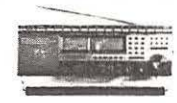

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what's new?

Signals for Sale

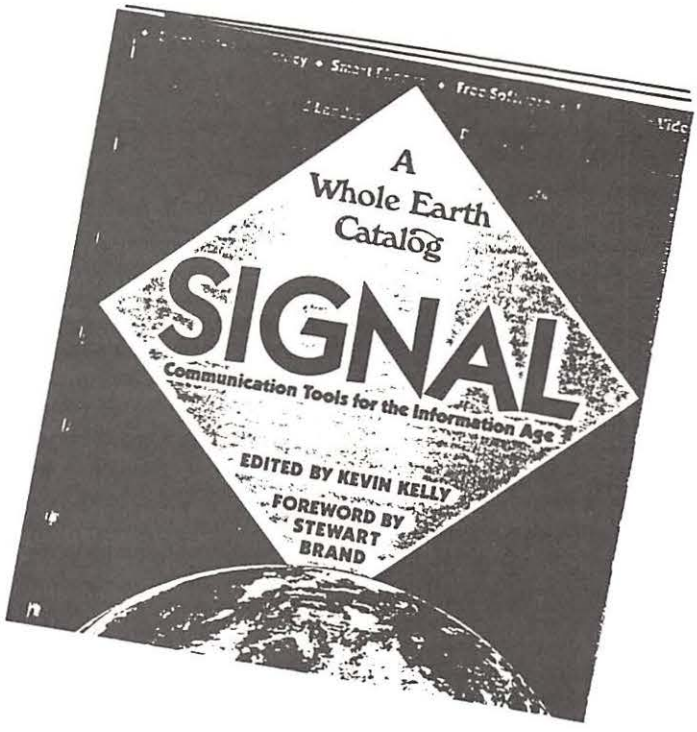
Since 1968, the *Whole Earth Catalogue* has been a bellwether of the counter culture, providing readers with information on topics as varied as organic farming, Zen buddhism, geodesic domes, earth homes and psychedelic research.

Today, the Whole Earth operation is, according to editor emeritus Stewart Brand, "in the hands of a new generation..." The new generation has put together a catalogue devoted to communications technologies and information systems. Editor Kevin Kelly "spent many hours in the cramped offices at Whole Earth in Sausalito, California, compiling information and investigating new products." The result, says a press release, "is a catalogue unlike any other, containing a unique array of communications tools and phenomenon of the information age."

Signal: A Whole Earth Catalogue Communication Tools for the Information Age, is not unlike rumaging around through the futuristic attic of some eccentric relative. Editor Kelly did a good job of assembling items that range from the fascinating and useful -- ranging from computers to global TV -- to the curious and just plain weird.

In Kelly's communications attic are some crazy things -- stuff that can give you the willies like a cobweb across the face. Take, for example, the piece about the guy who pushes hooks through his flesh and hangs himself from the ceiling front of admirers. You know, communication. OK. So some are *really* crazy but that's the exception rather than the rule.

Signal lists for $16.95 and is available at your favorite bookstore. Disturbing, informative and thought provoking, *Signal* is the kind of book that will get your creative juices flowing. -- Larry Miller



General RT Operator's Book

Tab Books has released a new book, Thomas *LeBlanc's General Radiotelephone Operator's License Study Guide*. It's a comprehensive 245 page volume detailing the revised FCC general radiotelephone operator's license exam.

The guide is different from the ham radio exam and the author stresses the concept of radio communications rather than the rote memorization of questions and answers. Concepts cover transmitters, antennas, electrical generators, frequencies and basic shipboard radio operation.

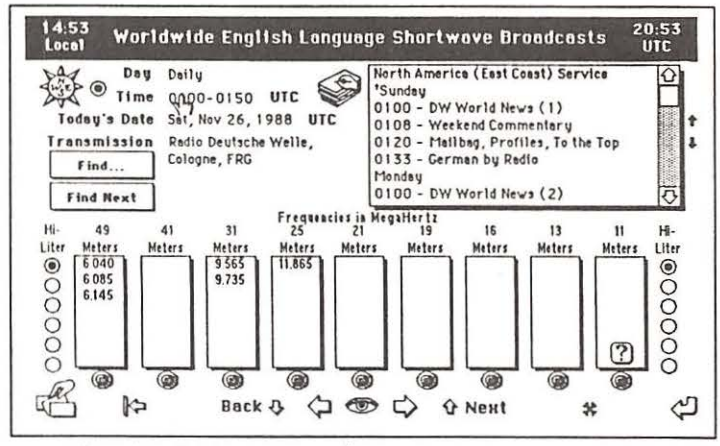
Also included is the test itself and study questions. Basic rules for emergency communications are also reviewed. Not appropriate for hams, if you need a General Radio Operator's License; however, this book offers "The Right Stuff." --Mark Swarbrick

To have your new product or book considered for review in Monitoring Times, send it to Editor, 140 Dog Branch Road, Brasstown, NC 28902.

Shortwave Navigator

Shortwave Navigator, a new program for the Macintosh computer by DX Computing, is one of the best hobby-related programs we've seen.

The program is a data-base of shortwave schedule information, accessible by station name, country, or time period. Listeners can highlight their favorite frequencies or just browse around to see what's on at the current time. Profile information gives address, interval signals -- which have been digitalized and are stored on disk so that you can *hear* them -- and times of broadcasts for the stations. By clicking the mouse on the broadcast times, listeners can see the schedule card for that broadcast (See illustration).

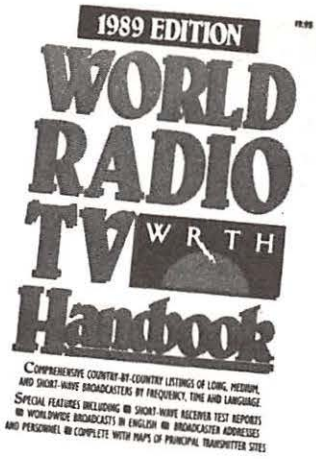


SW Navigator is a HyperCard Attack. That means that users must be able to use the Macintosh program HyperCard (version 1.2 or later), which comes with each new Mac sold. A hard disk is suggested to store the program.

Navigator is very user-interactive, featuring a full array of "buttons" which perform many of the operations of the navigator. It combines the features of *Passport to World Band Radio* and the *World Radio TV Handbook*. The only

drawback, of course, is that it can only be run on the Macintosh.

Shortwave Navigator version 1.0 is available for $49.95 in the U.S. from DX Computing, 232 Squaw Creek Road, Willow Park, Texas 76087. More information is available for a self addressed, stamped envelope to the same address. Please tell them that *Monitoring Times* sent you.
-- Kannon Shanmugam



World Radio TV Handbook

The new 1989 *World Radio TV Handbook* is now out. Sporting a green version of their standard cover this year, this 40+ year old reference offers DXers an unparalleled encyclopedia of information. Included are broadcast schedules, station addresses, phone numbers, FAX numbers, personnel, and, well, just about everything you ever wanted to know about a station but were afraid to ask.

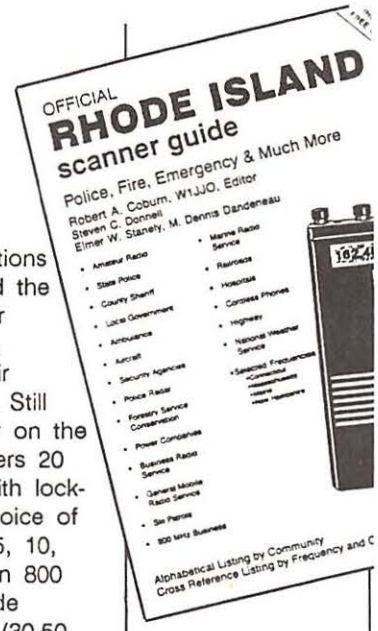
The 1989 *World Radio TV Handbook* is a must for every shortwave DXer and the perfect companion to your *Passport to World Band Radio* book. It's available from your favorite radio store.
-- I. Komprimis

AR880: Updated AR800

Ace Communications has announced the release of their new AR880 scanner, a scale-down of their discontinued AR800. Still the smallest scanner on the market, the mini offers 20 memory channels with lockout and delay, a choice of search increments (5, 10, 12.5 kHz; 25 kHz on 800 MHz band), and wide frequency coverage (30-50, 138-174, 436-512 and 830-950 MHz).

To accommodate the 30 kHz frequency spacing found on segments of the 800 MHz band, a 12.5 kHz offset switch is provided which may be manually activated for best reception.

The 880 comes equipped with a stainless steel belt clip, flex whip and four replaceable AAA batteries. Cost is $199 including shipping from Ace Communications, 10707 E. 106th St., Indianapolis, IN 46256.



Scanning Rhode Island

Rhode Island, a stone's throw across Long Island Sound, has been largely ignored by previous scanner directories. Bob Coburn, who specializes in New England listings, has righted that wrong with his newest directory.

Conveniently cross-referenced by service and frequency, the *Official Rhode Island Scanner Guide* concentrates on non-federal-government licensees found in the VHF/UHF spectrum -- public safety, business, conservation, railroads, maritime, aircraft, mobile and cordless phones, public utilities, ham radio repeaters and more.

Of particular interest are several introductory pages showing frequency allocations for various services, providing an excellent reference for frequency browsers.

The Guide is available for $14.95 plus $2.05 shipping from Official Scanner Guide, PO Box 712, Londonderry, NH 03053.

Phony Sony Rumor

One of our readers called asking about a new Sony portable, a model "ICF2015", destined to replace the incredibly popular ICF2010. Since we had not heard of such a future product, we contacted our receiver expert, Larry Magne who, in turn, contacted Sony.

The bottom line is, according to a Sony spokesman, they haven't heard of such a product either, and certainly no new Sony products will appear during 1989.

T.J. "Skip" Arey WB2GHA
P.O. Box 644
Waterford Works, NJ 08089

Uncle Skip's First Annual Radio Contest

One of the fun parts of listening to the amateur bands is hearing all the different perspectives of the folks on the air.

For example, a few days ago I was tuning across 75 meters and heard one ham commenting on his recent efforts in a contest. He was telling someone how he could have had a higher score if he would have put up his "third" antenna tower.

If you've ever listened to a Ham contest you have heard folks like this. Several hundred stations are trying desperately to call some guy operating from some rock in the South Pacific that only qualifies as a true land mass at low tide. All of a sudden this "Big Gun" comes on the air with a signal that can be heard on Alpha Centari. It wouldn't be so bad if he just exchanged a signal report like the other contesters, but the guy rubs everyone's nose in it by holding a conversation with the DX station.

Now let me say clearly that all Big Guns are not like this, but one or two of these superstations can ruin your whole day because, just when you back off and go looking for somewhere else to get a point, the Big Gun shows up like a bad penny on your new frequency. My years of playing radio have taught me to accept superstations in contests as just so much QRM. No sense in getting excited.

But what's the point, Uncle Skip???

Well, after hearing this guy talk about his station -- which clearly cost more than my house -- I swapped down to 40 meters where I ran across two guys who were discussing the same contest. One of the guys was expressing his excitement at picking up five new countries. He was using 100 watts into a dipole antenna that he wished he could get up a little higher but "Mom says 'no'."

I guess the point is that you don't have to be a Big Gun to get revved up about contesting. Heck, you don't even have to be a Ham. And (as Uncle Skip always tells you) you don't have to spend as much money as Mr. Big Gun to get your kicks. So with that, allow us to segue into...

Uncle Skip's Guide to Contesting

Some folks might ask what the point of contesting is if the Big Gun is just going to win anyway. Uncle Skip has been playing contester for years and I never once gave any thought to winning. If I didn't get a kick out of seeing my call in print, I probably wouldn't even bother to send in my logs. You see, the important reasons for working a contest are:

1. TO HAVE FUN
2. To improve your operating skills
2. To increase your QSL quotient.

I don't see anything in that list about winning. And, you can do all three with the simplest of stations.

By the way, contesting is not exclusive to the Ham. There are even some shortwave listening contests. Also, award and certificate chasing is just contesting spread out over a longer time period. If you were to tune in 14336 kHz USB most any day of the week you will hear a bunch of folks that get their jollies operating from and collecting all of the counties in the United States. The process of achieving "Worked All Counties" can take even the most dedicated listener several years. That is taking the long view on things, but you will be hard pressed to find a group of folks having more fun anywhere in the radio hobby. They also welcome SWL participation.

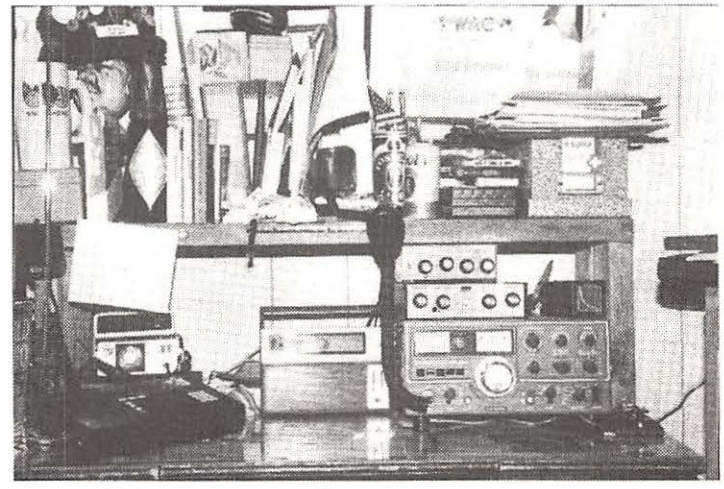
Scanner listeners might do well to keep an ear out for Amateur Radio VHF contests. The VHF crowd in Ham radio leans toward the experimental and often the exotic. The dedicated scanner listener will be able to log many fascinating stations.

Contact your local ham radio club for information about contests. Or pick up a copy of *QST* from your favorite ham dealer. If you still have difficulty tracking down any contests, drop Old Uncle Skip a line and I will get you hooked up.

Setting Goals

You can think of contests simply as the way to get a lot of interesting stations all on the air at once. Sort of a "database" of DX, a smorgasbord of signals, a quantity of QSOs. All you need do is give some thought to how you are going to slice this pie in the most efficient manner to achieve the desired result.

Go over your logbook and take note of what's missing. You can then determine how particular contests can help you out. A contest might serve to allow you to add particular points of geography to your log book. Often, certain places can only be heard during contests as that may be the only time someone goes there to operate.



Worry this station on April Fool's Day for a "coffee-ring" endorsement!

You might discover that certain contests will aid you in your efforts better than others. For example, a domestic contest will help you out if you are trying to achieve a "Worked All States" award while an international competition will feed you the fodder necessary for "DX" certificates.

Contests can also serve to help you understand the limits and abilities of your

It's My Contest and I'll Do What I Want To

Everyone should try participating in a contest at least once. Old Uncle Skip would also like to create an opportunity for Monitoring Times readers to have some fun together. Since I can't afford the burgers and beer to invite you all over to my shack, we can get together via the electric radio. So mark your calendars for... (drum roll please)

UNCLE SKIP'S FIRST ANNUAL
"REAL RADIO" CONTEST
April 1, 1989
1400 to 2200 GMT

The rules for operators are as follows:

1. 250 watts maximum power into a wire antenna. No rotatable beams. Reasonable power and antenna rules will give everyone a shot at having fun. Besides, a superstation won't help you because, in this contest, EVERYONE WINS!
2. Each exchange must include the sharing of at least one bit of information about yourself that has nothing whatsoever to do with radio. In other words, RAG CHEWING IS ENCOURAGED!
3. Suggested frequencies are 3900, 7200, 14300, 21400, and 28400 kHz. All operators should attempt at least 20 percent of their operating time on the novice phone frequency.
4. The call for contacts will be "CQ REAL RADIO"
5. The exchange of realistic signal reports is encouraged. There is no rush so you don't have to lie and tell everybody they are 5 9.
6. All participants are winners and anyone who sends in their logs to Uncle Skip will receive an official "cheezy photocopied certificate" to prove it.
7. SWLs are most heartily encouraged to submit their logs so they can also be winners. Don't forget to listen for Uncle Skip.
8. Anyone observed NOT having fun will be disqualified.

So on April Fool's Day the Big Guns can give it a rest and we can have a bit of a get together. See you on the bands, Campers!

existing equipment. You can often discover a great deal about the efficiency of your antenna when you look at your log after a contest. This is especially important for those folks who can't hang beams on towers to take absolute control over directionality.

SWLs can use contests to help them understand the sensitivity and selectivity of their listening post. If your receiver and accessories can reject the slop of a high powered station operating a few kHz up the band, you can use that information to assist you in your regular listening efforts. VHF listeners can use Amateur contests to grow in their understanding of how VHF signals can be transmitted over long distances. VHF propagation tricks have filled many books, but nothing drives a point home like hearing it over the air.

See my point yet, Bunkey? All these reasons to get involved in contesting and I have yet to talk about competition or winning.

The Game is Afoot

But then again, lots of folks do really enjoy the thrill of competition and the agony of defeat. Even if you don't have the latest in superstation technology you might still turn a respectable total based on operating skill and determination. For you, the contest is really a contest. Go for it, Pal!! Don't let Uncle Skip's ravings get in your way.

The key to success in contesting is to know the rules so that they can be used to your advantage. Most contests utilize a point structure that gives the operator "multipliers" for achieving certain goals. For example, you might get a multiplier for each new state or call area. The more multipliers you have, the greater your overall total of individual contacts will count. Many contests establish certain limits on operating time per band. Knowing the rules will help you to make most efficient use of your time and put you in the right place at the right time to achieve the most multipliers.

All contests have rules about submitting logs for credit. These are checked against other logs to assure fairness and accuracy. Submitting your logs to the contest authority promptly and in the proper format is the only way to assure proper credit for your efforts.

Most serious contests may expect the contestant to spend fairly long hours at the dials. You might want to perform a lifestyle check before embarking on this path. Can you really afford to lock yourself in the basement for a whole weekend without coming up for air or to talk to your spouse and kids?

If this rigorous schedule is not for you, fear not. Participate in the contest anyway; you will find that you are not the only person coming up short on operation hours. I know of one dedicated contester who doesn't even turn his rig on for the first few hours of each contest. He tells me that this gives the competition a chance to tire out the less serious participants. He also feels the overall frustration level is reduced as people settle in to particular operating patterns. He must be on to something because his scores aren't all that far out of line.

Old Uncle Skip likes to work a contest for a few hours, then I get away and do something else. When I get back to it I find that things have changed around enough to pique my curiosity again. To each his own.

mt

Dave Jones

430 Garnor Drive
Suffield, OH 44260

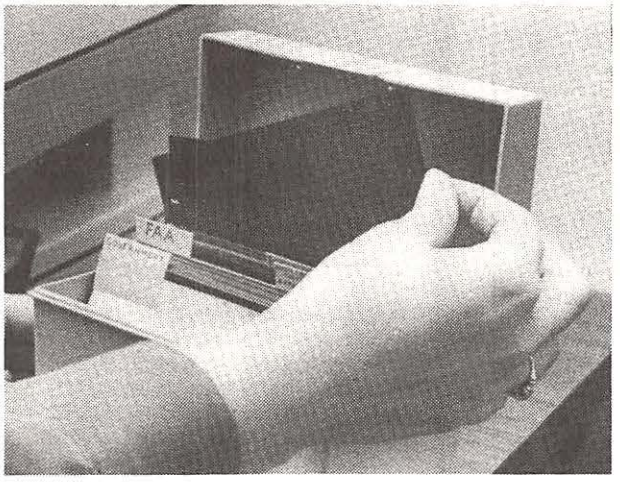
I R A C

Bill Smith, a rather enthusiastic but altogether fictitious federal monitor, decided to go "all out" in his search for frequencies. He loves monitoring -- eats, breathes and sleeps it.

Once, while reading an issue of *Monitoring Times*, he noticed something about the FCC's *complete* frequency list. It's so big, the article points out, that it had to be put on microfiche. And it's available to the public. This sounds great! All those federal frequencies! And heck. Monitoring *is* Bill's hobby. He leads a clean life, is active in church and community. Why not splurge just this one time?

After consulting with his understanding spouse, Bill writes up a not inconsiderable-sized check and sends away for a set of FCC microfiche. Several weeks later, the long-awaited package arrives in the mail. But when Bill sits down to read them, he is surprised -- not to mention disappointed -- to find that they contain no U.S. Government frequency assignments.

The problem is that Bill got the wrong set of microfiche. The FCC, also known as the Federal Communications Commission, coordinates and assigns frequencies for *non*-federal radio stations. The assigning and coordinating of U.S. Government radio station frequencies are performed by a different organization, IRAC -- the Interdepartment Radio Advisory Committee.



"Honey, are you sure this is what you wanted?"

IRAC, the Right Place

IRAC has been a part of the U.S. Government bureaucracy since June of 1922, yet little is known about it, especially by hobbyists.

IRAC's basic functions are to coordinate and assign frequencies to U.S. Government radio stations. The process requires the development and execution of policies, programs, procedures, and technical criteria pertaining to the allocation, management, and use of the RF spectrum.

IRAC implements these functions through a governing body consisting of representatives from various Federal departments and agencies. Table 1 lists the departments and agencies represented on the committee.

The list of agencies, departments, and military branches that are represented in IRAC is quite comprehensive. The FCC is not a member of IRAC; however an FCC liaison works with IRAC. A few agencies appear not to be directly represented. These include the CIA, EPA, HUD (Housing and Urban Development), and USDL (U.S. Department of Labor). Agriculture, Interior, Justice, and Treasury departments represent some twenty-plus other agencies, such as the FBI and U.S. Forest Service. The basic role of the representatives serving on the IRAC is to function, when in committee, in the interest of the United States as a whole.

IRAC is involved in the decision-making process of spectrum management in many respects. Cordless phones in the 46/49 MHz range were studied by an IRAC Ad Hoc committee -- the 49 MHz assignments were originally frequencies reserved strictly for Federal assignments.

IRAC approved the Coast Guard proposal to designate Channel 13 VHF-FM as the Great Lakes vessel bridge-to-bridge navigational frequency in 1987. IRAC also is reviewing the D.E.S. conversion and testing being performed by various federal agencies (refer to February 89 Federal File). IRAC also performs studies on spectrum usage with considerations given to existing and future technology and needs of users.

IRAC processes a large number of frequency assignment actions -- changes, modifications, deletions, and new assignments -- on average, over 5,000 assignment actions a month (during the period of 1986 July 1 through 1987 June 30). New assignments and modifications of existing assignments are almost equal at 47 percent each with deletions being approximately six percent.

Table 1
IRAC Membership

Agriculture, Department of
Air Force
Army
Coast Guard
Commerce, Department of
Energy, Department of
Federal Aviation Administration
(and DOT, except Coast Guard)
Federal Emergency Management Agency
General Services Administration
Health and Human Services
Interior, Department of
Justice, Department of
National Aeronautics and Space Administration
National Science Foundation
Navy
State, Department of
Treasury, Department of
United States Information Agency
United States Postal Service
Veterans Administration
Federal Communications Commission*

Table 2
Selected Federal Frequency Assignments

Agriculture	11,951	5.2%
Air Force	29,740	12.9%
Army	29,597	12.9%
Coast Guard	11,551	5.0%
Energy	7,445	3.2%
FAA	29,470	12.8%
FCC	639	0.3%
Interior	16,370	7.1%
Justice	17,346	7.5%
Navy	34,752	15.1%
U.S. Senate	2	0.001%
Treasury	6,713	2.9%

Very few frequency assignments are given up by an agency or department once assigned, even if not currently in use. Table 2 lists the number of assignments and the respective percentage (out of all federal assignments) for several major departments and military branches. The data is current as of June 30, 1987.

The military is the largest user in terms of number of assignments with almost 42 percent of all assignments -- over 100,000 frequency assignments!

Federal News

The United States Custom Service (USCS) utilizes a nationwide computer network to assist agents in their daily duties. The Treasury Department's Consolidated Data Network (CDN) is used by the USCS as well as by ATF and the IRS on a daily basis.

The CDN is a computer network with agents accessing the CDN via remote terminals at user's sites such as Custom stations along the borders. Customs agents can enter a vehicle license plate and within a few seconds the agent will know if the vehicle is a suspected smuggler or if the vehicle is wanted or stolen. The remote terminal uses leased landlines for communications with the net and the host computer and data base.

The initial phase was a successful pilot program involving 1,000 custom locations. After the initial pilot phase, IRS regional and district offices started integrating with the CDN and are scheduled for completion in 1989. The integration of the IRS into the CDN must be performed such that the USCS usage is not adversely affected.

The system is an important law enforcement tool permitting multiple agencies to share a common data base and hence increase the effectiveness of each individual agency.

PRO-2004 -- A UHF TV?

A Massachusetts firm publishes a quarterly security newsletter aimed at defense contractor employees. The newsletter highlights issues of concern and importance with respect to government security regulations for defense contractors. The newsletter usually contains interesting tidbits and short articles with a recent article being on telephone communications. The article addresses the problems of discussing sensitive data on unsecure lines and discusses the ease of access to cellular communications.

The article to this point was informative and technically correct; however, the writer then showed his knowledge, or rather lack of, of monitoring equipment. To wit -- "The first leg of cellular telephone calls -- from the car to the base stations -- are made over the open air waves. Radio Shack sells a device for under $400 which when hooked up to a UHF TV allows anyone to listen in on cellular phone conversations."

First of all, I wonder how the writer thinks that the second leg occurs -- from the base to the car. It could be assumed from the statement that the second leg is not over the open airwaves, perhaps the closed airwaves?

The second statement is far more amusing -- that Radio Shack sells a device that when hooked up to a UHF TV allows one to monitor cellular phone conversations. Perhaps Radio Shack should be informed of this new product so that it may be included in their next catalog. It is presumed that the writer was erroneously referring to the PRO-2004 scanner sold by Radio Shack. Of course, we all have our PRO-2004s connected to a UHF TV in the radio shack to receive 800 MHz transmissions.

mt

"Mac, you'll never believe it -- I can hear us talking on the TV!"

James R. Hay
141 St. John's Blvd.
Pointe Claire, PQ, Canada H9S 4Z2

Global Maritime Distress

The International Maritime Organization has recently developed a plan which it hopes will be implemented in the near future. While geared toward commercial shipping, the Global Maritime Distress and Safety System (GMDSS) will have an affect on all sizes of vessel.

The general intention in implementing GMDSS is to improve the chances of a distress call being heard, and once heard, in reducing the time needed to institute a search. Furthermore, it is hoped that improved methods of position finding can cut down on the time required to locate a distressed vessel and therefore improve the chances of rescue for the survivors.

GMDSS uses four categories to determine various requirements for radio equipment. These categories, defined by the waters a vessel will travel in, are as follows:

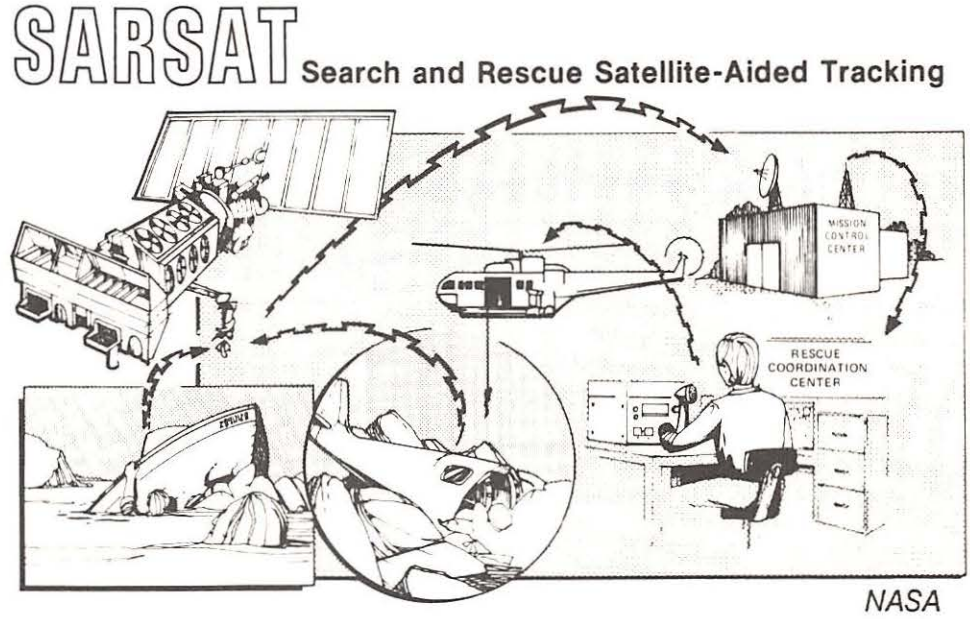
A1 Within range of shore based VHF stations.
A2 Excluding area A1 but within range of shore based MF stations.
A3 Excluding areas A1 and A2 but within coverage of geostationary satellites.
A4 Remaining sea areas outside A1, A2, and A3, which basically means the high north and south polar regions.

Ships traveling within these areas will be required to carry appropriate equipment. Currently the International Maritime Organization has developed requirements for ships of 300 to 1600 gross registered tons and for those over 1600 grt, however, no standards have yet been set for vessels smaller than 300 tons.

Digital Selective Calling

While new to maritime radio, digital selective calling (DSC) has been in use for some time in the aeronautical service. It involves the use of digital tones, much like those used for paging units, to call a particular station or group of stations. This has the practical effect of silencing the radio's speaker until a call intended for a particular station is made. DSC may also use a direct printing receiver similar to telex.

On MF, the frequency 2187.5 kHz will be used for area A2 as its equivalent to VHF channel 70. A frequency will also be set aside in each of the four, six, eight, twelve, and sixteen MHz bands.



NASA

NAVTEX

Navtex is a system which is currently operational on 518 kHz. It provides automatic direct printing of received navigational and meteorological information. This system would provide safety information to vessels mainly in coastal areas with coverage similar to that of current radiotelegraphy.

COSPAS-SARSAT

The Cospas-Sarsat system is operated jointly by Canada, France, the United States, and the U.S.S.R.. Currently there are two types of emergency position indicating radio beacons (EPIRB) now in use. Those operating on 121.5 and 243 MHz, when activated, will transmit a distress message on the two frequencies. A satellite overhead receiving this signal will simultaneously relay it to an earth station, if one is in range, along with position information. The disadvantage is that if there is no earth station in range of the satellite, the signal is lost.

The newer 406 MHz EPIRBs will also transmit a distress message; however, when a satellite receives this message, it is saved in an on-board memory along with time and position information and is retransmitted when an earth station is definitely in range. This greatly improves the odds for the vessel in distress. The newer 406 MHz beacon may well become a requirement for GMDSS not only in area A1 but also in coastal and offshore areas as well, given the circumpolar orbits of the Cospas-Sarsat satellites.

INMARSAT

Another type of EPIRB is in final stages of development which will operate through Inmarsat satellites. Once activated, a beacon will transmit a distress message giving location (from ship's navigation equipment) and identification of the ship. This message will then be transmitted via the Inmarsat satellite to a Coast Earth Station and thence to a rescue coordination centre (RCC). Trials with this system indicate an average time from transmission to reception by the RCC of under two minutes.

Another Inmarsat service, known as Priority 3, will allow those vessels fitted with satellite communications equipment to send a distress call directly to an RCC. When a special "SOS" button on the vessel's satellite terminal is pressed, a free channel is immediately made available to the station making the call. This allows rapid contact with a RCC.

If a channel is not available, one is made available even if it means disconnecting another call. This has resulted in over a 99 percent probability of a channel being available for a distress call, and an equally high probability of its successful completion -- a vast improvement over

conventional radio.

While larger ships are moving towards satellite communications Standard A equipment which allows voice, telex, and data communications, carries a price tag of $20,000 or more and communications costs are $12.00 per minute. Smaller Standard C equipment allowing only telex and data transmission costs approximately $5000 and will bring this equipment on board many smaller vessels.

Currently there are still debates being carried on at the International Maritime Organization regarding the implementation of GMDSS; however, it is currently anticipated that the system will be fully implemented by 1997, at least as far as vessels over 300 tons are concerned.

Currently the IMO is still debating the requirements for radio officers. Third world countries are arguing for compulsory carriage of "electronics officers" whose duties would include the repair and maintenance of all electronic equipment on board, and who would be able to make any necessary repairs while the vessel remains at sea.

Developed countries are arguing for the carriage of radio officers whose duties would remain chiefly communications and who, with the carriage of appropriate spare parts, would be able to replace failed circuit boards while at sea or carry out the maintenance of the communications equipment; major repairs would be left for shorebased facilities.

It is not yet known how the debate will end, and the decision will be an important one as the third world proposal would radically affect the shipping industry. Since smaller ships are not yet included in GMDSS, its implementation will not necessarily spell the end of Morse code on the air, as many smaller ships may still prefer to carry a radio officer. Until the final decisions are made, it cannot be predicted how maritime communications will be affected as we move into the next century.

For those who would like to listen to Morse code while it is still common, below are some frequencies to try.

Alger Radio (7TA)

4288 kHz
6415
8437
12662
16932

Aranjuez Radio

EDF	4235.5	EDF44	12691.0
EDZ	4269.5	EAD44	12887.5
EAD	4349.0	EIZ5	12934.5
EFD2	6330.0	EDG4	13056.0
EDG2	6337.0	EAD4	13065.0
EAD2	6382.2	EDF5	16942.8
EDZ2	6400.5	EDZ6	17064.8
EDG3	8457.0	EDG5	17175.2
EDF3	8473.0	EAD5	17184.8
EDZ4	8618.0	EDF6	22384.0
EAD3	8682.0	EAD6	22446.0
EDF4	12673.5	EDZ7	22533.0

Genoa Radio (ICB)

4235.0	16879.0
6425.0	16881.0
8649.5	16970.0
12978.0	17182.0

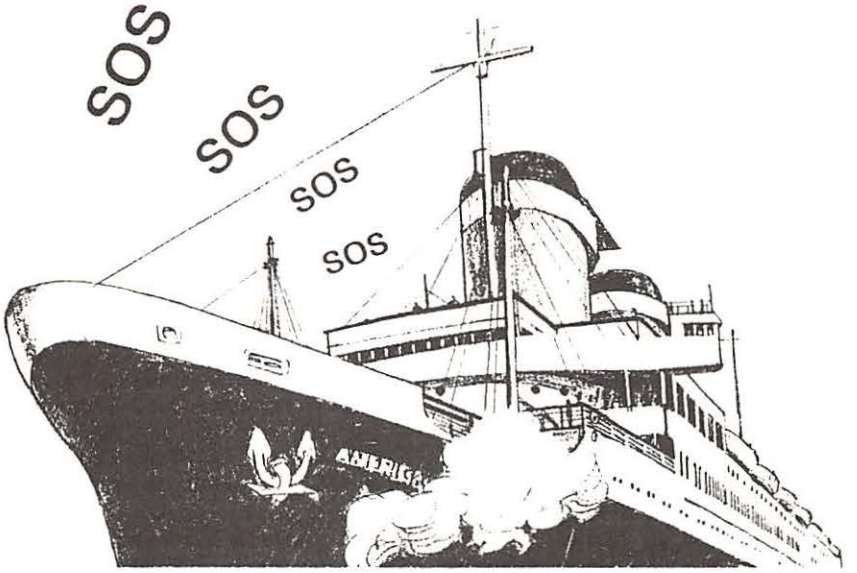
Durres P. T. Radio (ZAD)

CW	SSB
4220.0	402.0
4302.0	805.0
6434.0	1206.0
8696.0	1639.0
12690.0	2226.0
17173.0	

While there are many other stations, these listings may offer a challenge for stations which are not routinely heard, such as Portishead, Scheveningen, and the U.S. Coast Guard and Naval stations.

As always, your comments and suggestions are welcome so "keep those cards and letters coming."

mt



Ike Kerschner, N3IK

R.D. 1, Box 181-A
Kunkletown, PA 18058

Frequency Modulation

Is there a ham alive who has not heard about FM or operated this mode at some time in his amateur career? It's perhaps the most popular mode used on the ham bands! This wasn't always the case. In the 1950's and 60's NBFM (Narrow Band Frequency Modulation or just FM) seemed to be a doomed proposition. Those of us who heard it in use on our AM receivers were appalled at the terrible ruckus it made. In any case, most hams felt that SSB was the wave of the future and left NBFM for the crazies. In spite of this, a cadre of NBFM enthusiasts persisted.

In most cases, NBFM fans used home brew gear or converted Taxi-cab and police radios. A few pieces of commercial gear were available for FM. Perhaps the best known were the Elmac PMR receivers and AF transmitters (these were HF rigs!). Amateurs who purchased the Elmac gear and tried FM were impressed with the results. Still, few thought it would catch on in the amateur community.

As more surplus police, taxi and railroad VHF FM transceivers became available, some hams began using them as intercom systems to keep in touch with local friends. It did not take long for the advantages of this mode to become apparent. Mobile to mobile range was greatly increased over AM (commonly used on VHF), noise was almost nonexistent and the radio sat quietly till a signal came on frequency (due to efficient squelch circuits).

Another characteristic of FM is the ability of the strongest signal to capture the receiver. Generally speaking, this meant that FM was QRM (interference) free, so if a QSO was taking place on the frequency between hams, say, twenty or so miles away, it was possible to talk to local friends and not cause interference to each other.

In the mid-sixty's some hams on the west coast of the United States decided to build a repeater to increase the range between mobile stations. The set-up worked this way: A receiver was set up on a high point to receive incoming signals on some preset frequency. The incoming signals were then retransmitted on another frequency (usually 600kHz above or below the receiver frequency).

There were problems at first. As you might imagine, some means of reducing interference between the receiver and transmitter had to be found. Some systems used remotely located receivers sending the incoming signals via land line or UHF radio to the transmitter which might be several miles away.

Others used sophisticated isolator systems composed of a series of resonant cavities (duplexers) to allow the receiver and transmitter to be at the same location and, in fact, use the same antenna. Once perfected, these repeaters allowed hams on the two meter band to communicate at ranges of up to 100 miles (more in some cases).

You'd think that with all these advantages, the ham community would jump on the bandwagon with both feet. Wrong. The average ham did not care to modify a bulky surplus radio that took up half of his auto's trunk and required a dynamotor that was noisy and could quickly drain a car's battery. On top of all that, these converted rigs were able to operate on only one crystal-controlled frequency (several crystals could be added to the rigs, but required additional circuitry for each added channel).

Some of the amateur magazines (notably 73) began to tout FM and published information on converting surplus FM gear. A few manufacturers began to produce gear for FM; most of it was for two meters, although some activity was taking place on ten and six meters too. As hams began to get their hands on this compact transistorized gear, they began to realize the advantages FM offered. The revolution had begun.

The introduction of frequency synthesizers (made possible by modern IC technology) in the late seventy's allowed rigs to be operated on any frequency within the band with rock solid stability. No longer were we restricted to a few frequencies that were dictated by the number of crystals our rigs could hold (or our pockets afford).

Today we have handi-talkies that can be carried in our pockets and provide communication everywhere we go. Auto patches allow us to make phone calls from our cars, boats or the back forty. Repeaters have voice mail systems and computer voices tell us the weather, time or some special tidbit of information at the punch of a button.

Most FM activity remains on two meters (every town has at least ten two meter repeaters), although a growing number of amateurs are using 220 and 450 MHz. Too, ten meter FM is extremely active. There are a few repeaters on ten, but most activity is via the simplex mode (ie transmit and receive on the same frequency). The ability to chat with amateurs worldwide is the attraction drawing so many amateurs to the ten meter band.

This is far from the whole FM story; in future columns we will look at equipment requirements for the various bands.

MFJ Telescoping Two Meter Antennas

The IC 02AT on the left is sporting the MFJ half wave (MFJ 1714) antenna, while the IC-2AT on the right is armed with the quarter wave version (MFJ 1712). Across the front is the model 1710 three eighths wave antenna.

These antennas are very effective (just like having a healthy amplifier) to reach out there when the chips are down. Prices are low and results super.

Speaking of FM Equipment

MFJ has recently marketed three neat two meter antennas for HT's (see photo). First is the model MFJ 1712. Seven inches long when folded, this antenna opens to a full quarter wave on two meters. Next in line is the MFJ 1710. It measures a short five and one half inches. This gem opens up to three eighths of a wave on two meters (the 1710 includes a pencil clip so you can carry it in your shirt pocket). Last, but far from least, we have the MFJ model 1714. At ten and one quarter inches folded, I fondly call this baby "Hoss" cuz it grows to a full one half wave when stretched out.

I tested these antennas against the standard rubber duck antenna that came with my IC-O2AT. There is a repeater about 25 miles east of my home that I cannot open with the duck but using the 1712 I could open it with the ICOM at three watts. Signals were scratchy to be sure, but workable. The 1710 allowed me to

work the same repeater with one half watt and about fifty percent quieting. Switching to "Hoss" and one half watt, the machine was full quieting. Further tests reinforced the initial results.

The antennas produced similar results on VHF high band when used with a 100XLT. In fact, it is possible to monitor a repeater nearly 70 miles south of here and police signals from a community 40 miles west. Using the 1714 a neighbor is able to monitor his Emergency Medical group from places that were impossible with the rubber duck.

Do I like the antennas? *You bet!* They are available from MJF Enterprises Inc, Box 494, Mississippi State, MS 39762.

New Magazine

Ever think about ATV (Amateur Television)? I recently received a copy of *Amateur Television Quarterly* (ATVQ). This fine magazine covers the field of ATV with reports of gear, construction projects and general ATV news. The publication is interesting, in fact so interesting that I am now searching for a camera so I can begin construction on my own TV station.

Whatever your interest in image communications (Fast scan, Slow Scan or FAX), "ATVQ" covers it. Subscriptions are $15.00 per year in the U.S.A., available from *Amateur Television Quarterly*, 1545 Lee St, Suite 73, Des Plaines, Ill 60018.

Amateur Exams

The North Coast Amateur Radio Club (Cleveland, Ohio) is conducting amateur license exams for all classes -- Novice through Extra -- on the following dates during 1989, April 15, June 10, August 12, October 14, and December 9. For full info write Dan Sarama, KB8A, 15591 Rademaker, Brookpark, Ohio, 44142.

Propagation

During January there were only two days when the solar flux was under 200! The high was 291. What all this means is that we are in for a grand time DXing on the high frequencies. As spring approaches and days get longer, six and ten meters will be *hot*. Expect good worldwide DX on ten and twelve meters from sun-up to some hours after sunset. Six meters will be in great shape with openings to many DX spots. Fifteen meters will really hop and may be open 24 hours a day during many days of the week. Twenty four hour DXing on 20 meters will be common for the next few years.

Simple rigs and less than great antennas will do the job for you during the solar peak! Get on on the air and join the fun.

Hi Sailor

The U.S. Naval Academy Ham Club is attempting to compile a directory of USNA graduates, staff, friends, etc. that are radio amateurs. When the directory is complete it will be furnished free to all who submitted their calls. If interested send: name, call, address, favorite mode of operation, and relationship to USNA (e.g. alumni, staff, etc.) to LCDR M. Sweigert, Mail Stop 10B, USIS, US Naval Academy, Annapolis, MD 21402.

Cable Co Forfeits $2000

The FCC Philadelphia Field Office has ordered the Raystay Company to forfeit $2000.00 for repeated violations of the FCC signal leakage standard. During two separate inspections of its cable system the FCC found a total of 25 instances of excessive signal leakage.

FCC rules prohibit cable TV systems using frequencies between 54 and 2167 MHz from exceeding a maximum signal leakage standard of 20 microvolts per meter measured at a distance of ten feet from its cable. Compliance with this rule is required to ensure that cable TV systems do not interfere with over the air users in the same area. This is indeed good news for hams who have had to suffer with cable leakage interference. (The *ARRL Letter*).

Project Dove

The Brazilian MicroSat now under construction (known as *Dove*) is dedicated to educational purposes. Its main operating mode is a synthesized speech beacon that will be used to transmit telemetry and voice messages. The initial messages to be spoken by the voice synthesizer will be messages of peace and goodwill written and spoken by school children.

AMSTAT-NA Science Education Advisor Rich Ensign, NB1WJ, announces the continuing availability of the project Dove Educator Letter explaining Project Dove and the criteria by which messages are created for Dove to speak as it obits the Earth. Amateur radio operators world-wide who wish to involve local school children in creating messages for Dove and aid them in Dove reception once the satellite is launched should contact Rich Ensign, NB1WJ, AMSTAT Science Education Advisor, 421 N. Military, Dearborn, MI 48124, U.S.A.

MIR Update

UA3CR comments that Valeri U3MIR is not yet licensed but has used U3MIR unofficially on occasion. This could account for the lack of MIR activity to date.

The Well-Rounded Ham

My comments about the well-rounded ham were not appreciated by all who read them. LT Arnal Cook (U.S. Navy) took the time to write his thoughts on the subject. He states that "If...someone suffers longer than necessary, or worse, dies because of the delay in summoning help [when] I had the capabilities of instant, reliable and capable communications [but] chose not to be prepared that day, I would feel I let them, the community at large and ultimately myself down."

I could not agree more with LT Cook and thank him for his excellent response. I still don't think it is necessary to carry the HT blasting away. Keep it off till needed!

That burns up my space for another month gang. Thanks for your letters and cards. Gud DX es 73 - Ike, N3IK mt

the qsl report

Gayle Van Horn

P.O. Box 1088
Gretna, LA 70053-1088

A side benefit of QSLing is receiving your own copy of transmitting schedules and other souvenirs.

Albania

Radio Tirana, 7065 kHz. Partial data card, without verification signer. Received in 38 days for one IRC and an English reception report. Station address: Tirana, People's Socialist Republic of Albania. (Fraser Bonnett, Kettering, OH)

Burkina Faso

Radiodiffusion-TV Burkina, 4815 kHz. Partial data letter QSL, without verification signer. Received in 65 days for two IRCs and a French reception report. Station address: Boite Postal 7029, Ouagadougou, Burkina Faso. (Aboe Thaleip, Batang, Central Java)

Canada

CHNX, 6130 kHz. Full data "Greetings from Nova Scotia" card. Verification signer, K.J. Arsenault. Received in 25 days for an English reception report. Station address: Box 400, Halifax, Nova Scotia, Canada NS B3J 2R2. (Aboe Thaliep, Batang, Central Java)

Colombia

Caracol Primera Cadena Radial-Bogota, 4755 kHz. Partial data personal letter, stamped Caracol, without verification signer. Received in 37 days for one U.S. dollar and a Spanish reception report. Station address: Caracol Cadena Radial Columbian S.A., Avenida 19 No. 8-48, Bobota, Colombia. (Richard Coday, Oildale, CA)

Cadena Sutatenza, 5095 kHz. Partial data two-color QSL card. Verification signer, Luz Angela Duenas. Received in 150 days for two IRCs and a Spanish reception report. Station address: Apartado A., 7170, Bogota, D.E., Colombia. (Richard Albright, Merced, CA)

Costa Rica

TIM/Limon Radio, 17149 kHz. Full data QSL letter without verification signer. Received in 360 days for one IRC and a Spanish reception report. Station address: P.O. Box 54, San Jose, Costa Rica. (Richard Albright, Merced, CA)

Cuba

Radio Rebelde, 5025 kHz. Partial data card and personal letter, two station pennants and program schedule. Verification signer, Jorge Luis Mas Zabala. Received in 76 days after third Spanish reception report and a U.S. dollar. Station address: Apartado 6277, Ciudad Habana, Cuba. (Richard Coday, Oildale, CA)

Germany DDR

Radio Berlin Int'l., 11785 kHz. Full data station QSL, with illegible signature for veri signer. Received in 51 days for one IRC and an English reception report. Station address: DDR, 1160 Berlin, East Germany. (Fraser Bonnett, Kettering, OH)

Ghana

Ghana Broadcasting Corp., 4915 kHz. Full data QSL card, with verification signer. Received in 58 days for three IRCs and an English reception report. Station address: P.O. Box 1633, Accra, Ghana. (David Fields, Louisville, KY)

Hungary

Radio Budapest, 11910 kHz. Full data card, without verification signer. Received in 49 days for one IRC and an English reception report. Station address: P.O. Box 1, H-1800 Budapest, Hungary. (Fraser Bonnett, Kettering, OH)

Indonesia

Sumatera: Radio Republik Indonesia-Nabire, 5055 kHz. Partial data personal letter. Verification signer, Ismail Saya. Received in 31 days for one U.S. dollar and an Indonesian reception report. Station address: P.O. Box 11, Nabire, Irian Jaya. (Richard Coday, Oildale, CA)

Kalimantan: RPDT2K-Bulungan, 2977 kHz. No data handwritten letter, announcer's photograph, and boat scene postcard. Verification signer, Aditya-Administrative Translator. Received in 30 days for mint stamps and an Indonesian reception report. Station address: J1. Skip II, Tanjung Selor 77212, Kalimantan, Indonesia. (Aboe Thaliep, Batang, Central Java)

Kiribati

Radio Kiribati, 14802 kHz. Full data color postcard, without verification signer. Received in 21 days for one U.S. dollar and an English reception report. Station address: P.O. Box 78, Bairiki, Tarawa, Kiribati. (Richard Albright, Merced, CA)

Kuwait

Radio Kuwait, 15505 kHz. No data city scenery card and a program schedule, without verification signer. Received in 92 days for one U.S. dollar and an English reception report. Station address: Ministry of Information, Engineering Dept., P.O. Box 397, Safat, Kuwait. (Richard Coday, Oildale, CA)

Netherlands

Radio Netherlands, 6020 kHz. Full data scenery postcard, without verification signer. Received in 24 days for two IRCs and an English reception report. Station address: P.O. Box 222, Hilversum, Holland. (David Fields, Louisville, KY)

New Zealand

Radio New Zealand, 15150 kHz. Full data soccer/rugby QSL card, without verification signer. Received in 19 days for three IRCs and a cassette recording of a sporting event and program comments. Station address: P.O. Box 2092, Wellington, New Zealand. (David W. Fields, Louisville, KY) (Thomas J. Maslanka, Cleveland, OH)

Papua New Guinea

New Britain-Radio West New Britain, 3235 kHz. Partial data personal letter. Verification signer, Simon Muraga-Station Manager. Received in 68 days after third English follow-up report and one U.S. dollar. Station address: P.O. Box 412, Kimbe, Papua New Guinea. (Richard Coday, Oildale, CA)

Bouganville Islands-Radio North Solomons, 3325 kHz. Full data QSL letter, without verification signer. Received in 120 days for one U.S. dollar, a souvenir postcard, and an English reception report. Station address: Box 35, Kieta, Papua New Guinea. (Richard Albright, Merced, CA)

Solomon Islands

Solomon Islands Broadcasting Corp. (SIBC), 5020 kHz. Full data white station logo/antenna card, without verification signer. Received in 131 days for three IRCs and taped cassette report. Station address: P.O. Box 654, Honiara, Solomon Islands. (Ed Cichorek, Somerset, NJ)

South Africa

Radio RSA, 9615 kHz. Full data scenery card of downtown Johannesburg, without verification signer. Also received a large envelope of souvenir goodies. Received in 21 days for two IRCs and an English reception report. Station address: P.O. Box 4559, Johannesburg, 2000, South Africa. (David Fields, Louisville, KY)

Spain

Spanish Foreign Radio, 9630 kHz. Full data QSL card, station sticker and personal letter, with verification signer. Received in 72 days for two IRCs and an English reception report. Station address: Apartado 156.202, 28080 Madrid, Spain. (David Fields, Louisville, KY)

Switzerland

Red Cross Broadcasting Service, 15570 kHz. Full data "Red Cross" card and program schedule, without verification signer. Received in 30 days for two IRCs and an English reception report. Station address: 1202 Geneva, Switzerland. (Willem Pinangkaan, Menado, North Sulawesi)

United States

World Harvest Radio (WHRI), 7405 kHz. Full data purple and white logo card. Verification signer, Loren Holycross. Received in 74 days for an English reception report. Station address: P.O. Box 12, South Bend, IN. 46624. (Terry Powers, La Mesa, CA)

Venezuela

Radio Capital, 4850 kHz. Full data station card, and souvenir sticker, without verification signer. Received in 166 days for one IRC and a Spanish reception report. Station address: Centro Comercial Los Ruices, Av. Francisco de Miranda, Caracas, Venezuela. (Kenneth D. MacHarg, Jeffersonville, IN)

Jack Albert

203 York Place
New Lenox, IL 60451

6028 Series FDM

Last November I talked about FDM and I mentioned that there are several RTTY channels multiplexed on a single FDM group. Since then, I have received reports from Dave Wilson and others that there is a special type of FDM known as the "6028 Series" and it's gaining popularity on the shortwave bands.

I did some investigating and discovered that BR Communications in Sunnyvale, California, manufactures the equipment. After talking to them on the phone, they sent me a brochure on the "6028 Series" modem (pictured). This modem has been in use for a few years now by the Canadian government and it's becoming more popular in the U.S. because of its unique diversity capability.

"What is Diversity?" You Ask

For more than a quarter of a century, a system known as space diversity has been used to reduce the effects of noise and fading and therefore improving RTTY reception. Space diversity is done by transmitting the RTTY data on one frequency and by receiving it using two receivers and antennas that are spaced a certain distance apart.

Frequency diversity, which is an improvement over space diversity, transmits on two different frequencies, and two separate receivers and antennas are also used. Both systems require a special RTTY TU which has the ability to "vote" or decide which receiver has the best reception. The disadvantages to both systems are, in one way or the other, that they require the duplication of equipment and antennas.

The 6028 series system used the multiple channel capabilities of FDM and transmits the same data on all channels. The data on channel 1, for example, is transmitted and then delayed by one second. Then the delayed data is sent on channel 2 and then delayed another one second and transmitted on channel 3. The same is true for channels 4, 5, 6, and 7. This process is known as tone and time diversity.

This redundant system reduces errors because if data is messed up in channel 1, it may be possible to copy it two or three seconds later in another channel. Again, a voting system which is built in the computer's software is used to determine the correct character.

Let's say you copy the letter "Y". In the modem's memory there will be "YYGYYYC" because some of the multiplexed channels were clobbered by noise (channels 3 and 7 are in error). The 6028 system will interpret the final character as a "Y" because the software used a majority voting system. You can even copy YYBRTEX and still interpret the "Y" as a majority vote. This may sound complicated to you but it works the same as voice communications. If you repeat the message enough times, you will eventually get it right.

How-to

Copying the 6028 Series FDM is as easy as baking a cake. The channels are closely spaced using 85 Hz or 170 Hz shift (the Universal M-7000 can copy the 85 Hz shift using the VFT mode B). You only need to copy one channel at a time. Simply tune in a single channel by adjusting the P.B.T. on an Icom R71, or use the narrow (500 Hz) CW filter and the I.F. shift on a Kenwood R-5000. It's also better to tune to channel 1 or 7. Sometimes an audio filter will help but you need a way to monitor the sound (See Figure 1).

You won't have the error correcting capability using the direct method but you will be able to copy text using standard 75 baud RTTY. I use a RTTY tuning oscilloscope which displays the standard ellips patter to set the audio filters and the P.B.T. on my Icom R-71. Adjust the PBT and the audio filter until the fuzzy ellips clears up.

ZCZC

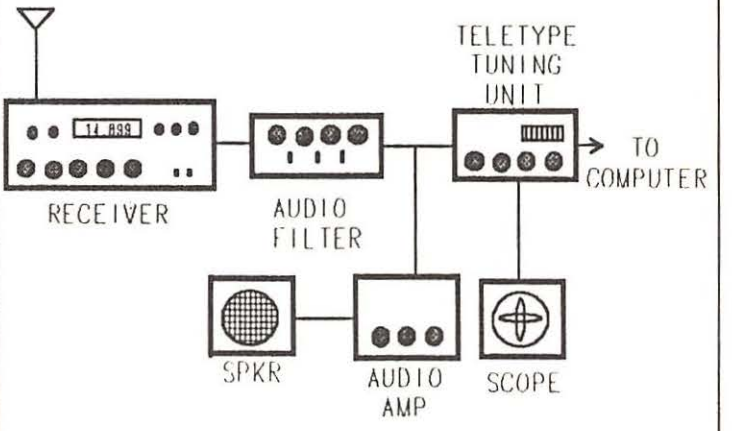


Fig. 1

6028 Series FDM Loggings

Frequencies used by the U.S. State Department and the USN

NAM Driver, VA (170 Hz shift 75 baud)

4723 kHz USB	1530 kHz	2210 kHz
6384 kHz USB	1190 kHz	2550 kHz
8053 kHz USB	1850 kHz	2890
10256 kHz USB	1870 kHz	

Canadian Frequencies **European links** (mixed with voice circuits) (on weekends)

VDD (call)	VER	VDD	VEL	VER	MKK
Debert			GFR		
Nova Scotia	Ottawa		Lahr AB		U.K.
4454 kHz	4559	4558	4824	4588	4630
4539 kHz	5848	5900	5889	5845	5787
7909 kHz	6864	7985	7923	7540	6950
7938 kHz	8013	10722	9162	10687	8025
	10833		11533	11516	10840
	14918				11437
					12265

Unknowns

5300, 7900, 7933, 8059, 9274, 10840

Ken Reitz, KC4GQA
Route 5, Box 156A
Louisa, VA 23093

Solar Outages and the Mail Bag

Twice a year broadcasters and TVRO owners alike suffer through a ten day to two week period of disruption of satellite signals due to a phenomenon known as a "solar outage." Coinciding with the vernal and autumnal equinox, it is basically a solar eclipse in which a particular satellite at a particular time of day comes directly between the earth and the sun. When this occurs, the enormous energy from the sun overpowers the energy emanating from the satellite and the video deteriorates rapidly.

Why Equinox Outage

It happens that the world's domestic communications satellites are arranged in a ring around the earth, coinciding with the equator at 22,500 miles. This ring is known as the Clarke Belt and if you guessed that it was named after scientist/writer Arthur C. Clarke, you're right.

When a satellite is launched to orbit in the Clarke Belt, it appears to be stationary in the sky. This is called a geosynchronous orbit, and it's the reason that, when you press G-1 on your receiver's remote control, your dish rotates to that point in the sky where Galaxy 1 resides and stops. Night or day, summer or winter, snow or rain, it's always there delivering crisp, near studio-quality pictures and stereo audio.

However, during the spring and fall, the sun's progress inevitably brings it into line with the earth's equator and thus with the satellites in the Clarke Belt.

Fortunately, the outage lasts only about five minutes per bird, though it is possible to "track" the sun for hours from SpaceNet 2 in the east to Satcom 1 in the west.

Solar Meltdown?

Aside from the inconvenience of a few minutes of lost programming, there are really no dangers in the solar outage period. I have heard stories of TVRO owners using ten foot, one piece stainless steel dishes whose surfaces were so reflective that, during a direct solar outage, components in the feed horn could literally be fried. My experience with fiberglass and mesh dishes has not included such dramatic results.

Here's an installation tip: Avoid setting the tracking parameters or peaking a dish during the solar outage period. It will drive you to distraction to attempt to adjust the dish while the video slowly disappears. Put off any dish up-grades or component adjustments for another week.

Son of Sports Fanatic

Last month I listed various regional and national sports networks where you could catch your favorite teams or sports. If you are a college basketball fan, March is the month you've been living for. Along with all the various conference tournaments happening at this time, there's the NCAA and NIT tournaments.

For the best college basketball of the season, look for conference tournament backhauls on Telstar 303, Westar5, SpaceNet 1, Westar 4, Telstar 301, SpaceNet 3, Telstar 302, and Galaxy 2. When you check each satellite, make notes as to which conference is on which transponder and you'll save yourself some bird hopping.

Long Life Ahead for C-Band

New life at C-Band is the word from Marty Lafferty, VP of Cable Services for GE Americom, owner of the Satcom birds. Speaking on the SBCA Information Network (G1 xpnder 18 6.8 audio) Lafferty said, "We are going to nearly double the power output of the transponders -- up to 16 watts on C-3 and C-4. This will mean a much sharper picture for those who currently own dishes and allow future customers to purchase smaller satellite dishes."

Here's the best news: C-3, to be launched mid-1992, will replace F3R (the weakest of the so-called cable birds, it's slightly off axis and has one dead transponder). C-4 is scheduled for launch late 1992 or early 1993 and will replace F4 (the second weakest satellite and home to most of the regional sports networks). Lafferty also said, "We have increased the probability that all 24 transponders will be in service for a full 12 years . . ."

Classified Ad Network

It's for real. According to a report in *Multichannel News*, the Consumer Classified Advertising Network (CCAN) will be a 24 hour basic service which will run local, regional, and national ads.

With limited channel space on most cable systems, how will the channel weasel its way onto your cable system? Simple: the cable operator will receive 25 cents from each dollar in monthly revenue from local or regional ads. Can't you just wait to see C-SPAN dumped for CCAN? If you're a dish owner, that won't happen.

European TV

Cable and satellite television in Europe is about where it was in the U.S. seven or eight years ago. The most ambitious project so far is Rupert Murdoch's Sky Television, a six channel DBS service scheduled to begin programming this spring aboard the Astra satellite.

Astra is a Ku bird with 16 transponders each with an output of 47 watts enabling viewers to use dishes roughly three feet in diameter. The channels include three advertising supported services; Sky Movies (a premium movie channel), the Disney Channel, and an as yet unnamed arts and classic movie channel.

Murdoch will slug it out in the sky with British Satellite Broadcasting (BSB), the only competition. BSB, however, will give the edge to Murdoch starting out with only three channels. Keep in mind that British consumers will have to buy the equipment (including a decoder) and then start paying for the services.

The Landscape Channel

That's the name for a European channel that has hopes of finding a home on American Satellites by the middle of this year. The channel features uninterrupted videos of soothing landscapes and sound tracks of new age and classical music. The purpose is to sell the videos to consumers in the same fashion that MTV sells rock music. Well, there's something for everyone in the sky.

Mail Bag Basics

• Eugene Klos, of Deerfield, Massachusetts, writes: "Your article in the December, 1988, *Monitoring Times* on the future of the Ku band was very interesting . . . I have been thinking of going to a dish but have hesitated because of the uncertain nature of the business.

"[Also] without knowing what the nail diameter is in the page 48 photo makes the test rather difficult to apply. Can you advise?"

There are aspects to satellite telecommunications which are uncertain but there are more which are certain. First, C-Band satellite TV will be with us for at least ten more years. That's because the new generation C-band birds just now going into

service or yet to be launched have a lifespan of at least ten years. That means that there will continue to be between 100-150 channels of news, sports, and entertainment for home dish owners.

Even at the modest rate of 15,000 to 20,000 new dish installations per month, the back yard dish market will continue to expand. This will attract more programmers and help to lower subscription prices for existing scrambled services as well as make used systems available to those wishing to spend less to get started in TVRO.

• As for Ku: The realistic future (as stated in the December column) is still a few years away. But don't worry, you'll be inadvertently prepared anyway. As far as I know, all new satellite receivers are Ku capable and all new mesh dishes will reflect the Ku wavelength. All you'll have to add will be the C/Ku feed horn and the Ku LNB and you'll be ready. The question is: is Ku ready for you? The answer is still: not yet. There's just not enough programming on Ku for the average consumer to bother with.

The nail, by the way, was a sixteen penny or about 5/32" in diameter. If it won't pass through the mesh holes, neither will the Ku signal. If you're buying a dish with an eye to future Ku reception, a critical factor is dish efficiency at Ku frequencies. Every dish has an efficiency rating, usually expressed in percent, for C and Ku frequencies. Your dealer or the dish manufacturer will be able to provide you with that information. The best dishes will have a high percent efficiency at both frequencies.

• Roger West of Amery, Wisconsin, writes: "Your article, 'Black January: Three Years Later,' I found to be very interesting as two days before receiving my magazine, I had a salesman out to talk to us about a satellite TV dish. In that article you stated that a person should do their own installing. Does the system come with instructions? Also do you have any general guidelines for picking the dish site? [Are there] supposed to be tougher laws written for those who use a satellite system?"

Roger, some mail order systems do, indeed, come with instructions. Others also operate technical hotlines for installation assistance from experts. In addition, there are a number of sources for installation how-tos. There's a thorough treatment of installation in the Fall '87 issue of *Super Television* (now Camcorder Report): a less satisfactory treatment in the Summer '88 Camcorder Report. Write for back issues at Miller Magazines, Inc., 2669 E. Main St., Ventura, CA 93003.

Probably the most detailed information will be found in *The Home Satellite TV Installation & Troubleshooting Manual*. It costs $29.95 plus $2.00 shipping and handling from STV Bookstore, P.O. Box 2394, Shelby, NC 28151. For a free 30 page introduction to satellite TV, write Triple D Publishing, Inc., at the STV Bookstore address and ask for their booklet, *Satellite TV and You*.

• As to general guidelines for picking a dish site, here's what you need to know:

1. A clear and unobstructed view to the southeast at least 25 degrees above the horizon and to the southwest at least 10 degrees above the horizon.

2. Pick a site within 100 feet of the intended receiver location. Too much lead-in could reduce signal strength.

3. Try to stay away from trees nearby or far. Overhanging branches may block signals. Remember: Unlike over-the-air transmissions, satellite microwaves will not penetrate leafy foliage.

4. Scout the area within five miles of your location to determine if there are any microwave relay towers such as those used by telephone companies. These towers could be a source of unending frustration known as terrestrial interference (TI).

• And finally, there are no constitutional legal restrictions for TVRO owners. The "Cable Communications Policy Act of 1984" legalized the manufacture, sale, distribution and use of home satellite systems. In addition, the Federal Communications Commission (FCC) enacted, in January 1986, a federal rule preempting state and local zoning laws that unfairly discriminate against present and future TVRO installations. This rule has been upheld in every case that has come to trial.

If you have been a victim of local or state zoning regulations concerning your TVRO installation, call the Satellite Broadcasting and Communications Association (SBCA) legal counsel at 703-549-6990 or call the American Home Satellite Association at 800-321-AHSA (2472) and ask for more information.

Space Junk

And finally, thanks to Ruth Hesch of New York for a clipping from the New York *Times* on the problems caused by space pollution. We're not talking about programming material here but debris in near Earth orbit. It seems that several future space projects could be severely damaged by the many thousands of bits of hardware from earlier space efforts.

Projects which could be in jeopardy include the proposed space station, the Hubble telescope, and the Gamma Ray Observatory. This could also be a disaster for communications satellites before they achieve geosynchronous orbit. One small fragment of space junk could destroy a satellite. This is probably a good reason not to test out anti-satellite weaponry in space as it would unquestionably add to the problem.

mt

Larry Miller
P.O. Box 98
Brasstown, NC 28902

I Saw the Light

It was last fall that WWYZ saw the light -- or the lack of it. Ratings were, as one station official put it, "bad."

WWYZ's problem wasn't that it was on AM. It wasn't trapped in some backwater market either -- unless you consider the Hartford/-New Haven, Connecticut, market "the sticks." No, WWYZ was an FM, 12 years in the same format with a powerful, 50,000 watt signal and good dial position. And still it came in eighth.

"We were floundering," says program director Johnny Michaels. "We had been various forms of adult contemporary [during the past 12 years]. We started as a soft rock station and went from there to a few more pop chart numbers." Most recently, the station had been billing itself as playing "The Latest Hits and Greatest Oldies."

But that was part of the problem, says Michaels. "Listeners didn't know what we were trying to be." On one hand, WWYZ looked like a poor imitation of the more successful "oldies" stations. On the other, the station sounded just like any other amorphous, mainstream, contemporary music station.

"Listeners didn't know who we were so they didn't see any big benefit to tuning us in." Once station officials realized this, seeing "the light" was only a split second behind. Somehow, WWYZ had to stand out. A change of format was at hand.

PD Michaels admits that he did precious little research before changing to the new format, calling only three other station managers for feedback. The station wanted to keep things as low-keyed as possible, fearing that someone else in the market would find out what they were up to. "We're not the only ones in this market that are floundering," Michaels points out.

Then one day, without any warning whatsoever, WWYZ made the change. The choice -- the idea on how to bring in the listeners -- was not well received by the staff. One-fourth of the on-air staff resigned. "You could see some pale faces in the crowd," laughs Michaels.

What brought on this sort of reaction? Country music. What's how WWYZ decided to bring in the listeners.

"It's not cats howling on a fence any more," says Michaels almost apologetically. "Sure, there are bluegrass and truck-drivin' songs, but we play the hottest country out, music that has been recorded within the last ten years."

And now, after a ten year absence in the Hartford/New Haven market, country music has returned.

WWYZ uses other gimmicks in order to bring in -- and keep listeners. For them, the 200 letters a day from people wanting to join their "Country Club" tells them they're doing OK. Other stations use FAX machines, urging listeners to FAX them everything from music requests to "dirty" xeroxes. For others, hot air balloons emblazoned with station call letters does the trick. The game is called "promotions" and the score is tallied in the number of listeners gained.

Magic Bus

Made for each other

Sometimes, radio promotions can be a match made in heaven. Take the example of WUSA-FM in Tampa, Florida and the Pinellas Suncoast Transit Authority -- two unlikely partners if ever there could be. After four years of decreasing ridership, PSTA decided that something had to be done. About the same time, people over at WUSA-FM were sitting around, scratching their heads and looking for a way to attract a younger audience.

Together, the two decided to offer the citizenry a free ride. For six months -- 'til the end of June -- the radio station will travel different morning rush-hour bus routes, offering free rides along with coffee (from the people at Maxwell House), danish (supplied by Entenmann's bakery) and a copy of the *St. Petersburg Times*. Every once in a while, DJs Bob DeCarlo and Judd Otis actually hop on the bus and do their show live.

So far, reaction has been good. "I think it's terrific," said Mark Kruger, who is a regular rider. "A free cup of coffee and a free bus ride -- you can't beat it!" Even driver Pat Zigmond seemed to be enjoying himself, telling passengers to "put your money away and get on in here." Zigmond said that this time was the first he ever had a hostess aboard his bus. "I did have Santa Claus once but that's about it."

Ti-Rone on the Telephone

"He didn't tell me that he was married when we met," anguished the writer of one letter being read over the air. "But then his wife walked up to me.

"I work two jobs. I do the cooking and cleaning. He comes home and doesn't do anything. Don't you think I should have his name and not her?"

The host does not pause for a second before his reply: "You want a name?" he says. "I'll give you a name. Boo Boo the Fool. She does everything. He doesn't do nothin'. Where are all these stupid women when I want someone?"

His name is Ti-Rone, advice-giver to the lost and lovelorn on Philadelphia's WDAS and 90 other radio stations across the country. In just six months, it's become one of the hottest syndicated "urban" features going. At WDAS, program manager Joe Tamburro purchased

the three-minute feature for use during the mornings. But the station jocks love it so much that he agreed to replay it in the afternoon as well.

Ti-Rone, who in real life is Los Angeles-based comedian/actor/writer Brad Sanders, originated the character for a popular Chicago radio show on which he performs.

"Originally, Ti-Rone offered his advice to stars like Prince or Michael Jackson if they did something stupid that week," Sanders said. "But when I launched 'On the Phone with Ti-Rone,' as a syndicated feature, I decided to offer his advice to anyone who needed it."

Apparently, plenty of people need it. Letters pour in from around the country -- most of them from women. Sanders says that his advice usually boils down to standing up for yourself, being responsible and facing life with a positive attitude. If that sounds serious, it is. Nonetheless, "On the Phone with Ti-Rone' is hilarious, if not for what he says, but the street-smart, down-and-dirty way in which he says it. As Ti-Rone would say, "Can you dig it?"

People are also digging the new gospel radio station in Bridgeport, Connecticut's East End. Everyone except the FCC, it seems.

From Bishop Willie Hardy's Crusaders for Christ storefront church in the city's bombed-out East End, WGEC attempts to reach out to drug pushers and the hopeless with the sounds of foot-tappin', knee-slappin' Gospel music.

"We're not here for the money," says the church's assistant pastor and on-air personality Earl Crummy. "We're doing this to spread the Gospel." While there is evidence that the stations is being listened to, the FCC remains unimpressed. The problem is that Bishop Hardy's radio station doesn't have a license.

"A pirate station?" says the FCC's Jeff Young from his office in downtown Washington. "We'll close it down."

The FCC shouldn't sound surprised. This is Hardy's second pirate station in Fairfield County. Both use the call letters WGEC, an acronym for the Greater Emmanual Church. Indeed, the church was quite open about the station's sign-on. It even sent out flyers to legal stations in the area announcing their sign on in the upper reaches -- above 1600 kHz -- of the AM band.

"I suspect that they are sincere but they just aren't familiar with FCC regulations," says the president of the real WGEC (in Springfield, Georgia), James Birkitt. John Quinn of WFIF in nearby Milford, "Maybe in their zeal to serve the Lord, they overlooked things."

Mailbag

George Viera of New York City checks in with a quick note. "I don't know who likes stories about FM-DX catches, but here's mine if it might help. The other Saturday, I was listening to my JVC AM/FM/SW cassette recorder/radio. At about 11:00 pm or so, I heard a new station that called itself WRAP-FM at 108.3 MHz."

This apparently wasn't caused by a screwy radio, either, because George says that they actually announced the 108.3 MHz frequency. The next morning, the station was back on the air. The signal, says George, "was very weak."

Congratulations, George. That *was* quite a catch -- a pirate. Such activity is not unusual. One pirate I spoke with via phone told me that New York City is crawling with illegal broadcast stations.

New Station Grants

Alabama: 104.3 Brantley; **California**: 89.7 Visalia; **Connecticut**: 103.3 Sharon; **Florida**: 92.7 Marco, 990 Miami and 88.1 Ocala; **Georgia**: 91.7 Valdosta; **Illinois**: 106.1 Oregon; **Indiana**: 104.3 Charleston amd 1030 Union City; **Kentucky**: 101.5 Buffalo; **Louisiana**: 96.5 Breaux Ridge; **Maine**: 1600 Brewer; **Minnesota**: 96.1 Albert Lee; **Mississippi**: 94.5 Bruce and 1240 Southaven; **Missouri**: 92.3 Cameron; **Nevada**: 750 Carson City and 1200 Virginia City; **Oregon**: 91.5 Roseburg and 104.3 Tri-City; **Pennsylvania**: 95.5 Salladasburg; **South Carolina**: Abbeville; **Tennessee**: 93.9 Spring City; **Texas**: 95.1 Caldwell amd 103.5 New Boston; **West Virginia**: 102.7 Mannington; **Wisconsin**: 106.9 Brookfield. Many thanks to our good friends at *M Street Journal* for that information.

Be an American BandScan Reporter. *See any stories about radio in the local paper? Send them to Monitoring Times, P.O. Box 98, Brasstown, NC 28902.*

For Sale

10,000 watt AM in Kansas City, **Missouri**. Low price. Terms available. Perfect for first-time radio station owner (Rich Bott, 816-252-505). 100,000 watts in large **Montana** city, $700,000 (Business Broker Associates 615-756-7635). Nine station group and two FM construction permits in **Texas** and **Oklahoma**. 90% financed. $2,500,000; $250,000 down (Jamar Associates 512-327-9570). Salt Lake City's #9 FM. $975,000 terms. Includes real estate and suburban AM (Felix Farnsworth, 180 S. 300 West Siuite 200, Salt Lake City, UT 84111).

International BandScan

According to European readers, a number of private radio stations are on the air in Italy. One, mentioned on Sweden Calling DXers, is 1584-RadioBenakus. It broadcasts in German from 0830 to 1900 UTC.

According to Arthur Cushen, religious broadcaster Radio Rhema has announced tentative frequencies for its new stations: 540-Bay of Plenty (Rotorua/Tauranga), 994-Timaru and 1404-Invercargill. Taupo will be on an unnamed FM frequency. Applications are pending for Auckland, Gisborne and Dunedin.

Russia's Radio Peace and Progress broadcasts to Europe in German from 1530 to 1600 UTC on 1386 kHz and from 2230 to 2300 on 1323.

In addition to our own information, we've included information from the following publications and American BandScan reporters: BBC Monitoring Service, *Bridgeport* (Connecticut) *Light, Broadcasting, FMedia!* (Dr. Bruce Elving), *Hartford Courant* (Kent Plourde, Bristol, CT), *M Street Journal*, Scott Tawl, *St. Petersburg Times* (Don Bice, St. Petersburg, FL), *Sweden Calling DXers*. For information on how to subscribe to many of these publications, send an SASE and an additional 25 cent stamp to American BandScan c/o this publication.

mt

Dr. John Santosuosso

P.O. Box 1116
Highland City, FL 33846

Clandestine Greetings!

Among the more unusual items to show up in the mail box lately was a Christmas card from UNITA (National Union for the Total Independence of Angola). UNITA opposes the Marxist government of Angola and operates clandestine The Voice of the Black Cockerel. This has to be one of the more creative methods used by a clandestine broadcaster to keep in touch with listeners.

Although not always easy to hear, you will find the Black Cockerel on 4973 kHz. Look for it in Portuguese, signing on with its distinctive rooster crow interval signal around 0330 UTC. Occasionally, taped reception reports will be verified by Free Angola Information Service, P.O. Box 65463, Washington, DC 20035-5463.

Because of an American sponsored peace plan involving Angola, Cuba, and South Africa, it is possible that the Black Cockerel's days as a clandestine station may be numbered. While it is premature to say what Angola's future will be, UNITA may ultimately end up sharing power with the present government if an overall settlement can be worked out.

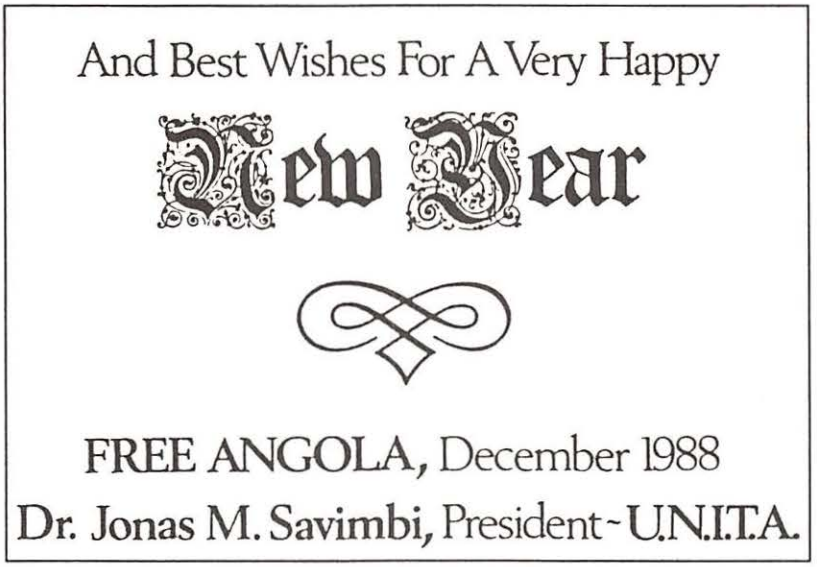
There has long been speculation that the Black Cockerel transmitted from South African soil. However, Lynda Schuster of the *Christian Science Monitor* visited UNITA-held territory in Southeastern Angola and was able to tour the station's facilities at Jamba. Jamba functions as UNITA's capital. The Black Cockerel is thus a truly Angolan clandestine.

Radio Free Dallas

RFD is one of the most widely heard pirates these days. We recently heard directly from the station manager, Curtis. He reports that WRFT broadcasts on 7415 kHz with 20 watts. The schedule is UTC Tuesday and Sunday between 0200 and 0700, with programs normally lasting 95 to 105 minutes.

Curtis states, "Broadcasts are live, featuring classic hits of the 1960s, 1970s, and 1980s. Interviews with artists, R&B, Blues features, and comedy programs will be presented during our weekly broadcasts, along with a program to teach our listeners the Texas language. Our editorial policy proclaims Texas to be a free and sovereign nation."

WRFT does verify reception reports. They can be sent to 1007 South Ervay, Box 300, Dallas, TX 75215.



Christmas and New Year's greetings were received from UNITA!

A number of *Monitoring Times* readers are hearing WRFT both at its scheduled times and at others as well. In Tennessee, Bob Thomas logged the station on no less than six occasions, including three nights in a row! He reports that the station sometimes signs off with a Momma Cass recording. In Florida, Terry Krueger reports hearing WRFT "almost nightly."

Falling Star Radio is another station which is currently reaching quite an audience. It was logged by this writer on 6240 from 0443 to 0530 UTC with a program which, in addition to music, included an aid appeal for Armenian earthquake victims and an update on Radio NewYork International. Bob Harris has also heard it with a relay of KPRC 91.5 FM, as has Terry Krueger. In addition, Krueger monitored it relaying another station tentatively identified as WXMN in New York City on 89.5 kHz.

Ohio's Fraser Bonnett is another listener to Falling Star Radio. He notes the address is P.O. Box 1659, Gracie Station, New York, NY 10028.

Zoom Black Magic

Thanks to California's Carl Smith, this column has for quite some time been able to inform readers about a pirate who is now beginning to attract considerable attention. This is Fresno's Zoom Black Magic and its operator, Walter Dunn, better known as the Black Rose. The Black Rose broadcasts on 100.5 MHz with a power of 140 watts. His programs are primarily intended for the black population in the Fresno area. Despite one FCC raid, Zoom Black Magic still manages to survive.

Recently Carl sent us a fascinating tape of an interview with the Black Rose by Tom Head of Fresno's talk and news station KMJ (580 kHz). Although the Black Rose was reluctant to discuss it, he appears to be contemplating a new broadcasting effort, and one potentially much larger than Zoom Black Magic. Apparently the Black Rose has been approached by an unidentified rock and roll magazine about obtaining a station in Mexico and broadcasting from there. Exactly what the group has in mind is not clear, but California's legendary black pirate may eventually have a much larger audience than Fresno.

Another station intended for a predominantly black audience is the recently established WGEC, broadcasting on 1610 kHz from the Crusaders for Christ storefront church in Bridgeport, Connecticut. It is a Gospel music station under the direction of

church bishop Willie Hardy. Hardy also operates another WGEC in Stamford, Connecticut, which has been on the air for about two years. The stations take their call letters from Hardy's Greater Emmanuel Church in Stamford.

While both Connecticut stations are staffed by persons very dedicated to religious broadcasting, they also share a common problem. They use the call letters of a licensed station in Springfield, Georgia. Thanks go to Connecticut's Bob Thomas who sent us the WGEC story as it was reported by Joanna Hernandez Otto in the Bridgeport *Light*.

The RNI Report

Have we heard the last of Radio NewYork International? I think not. However, in all probability the next time you hear "RNI," it will have a quite different format and be originating from a new location. It will also probably have made peace with the U.S. government. Hopefully, more can be said about all of this later. Stay tuned, and remember the words of Yogi Berra, "It ain't over 'til it's over."

Anti-Castro clandestine Radio Caiman has been heard recently testing and with regular programs on the approximate frequency of 9668 kHz. If the severe QRM which plagued them on their former frequency of 9660 moves, then we will know what some of us have theorized -- that it was intentional. When Caiman is not blocked by interference, it is the easiest clandestine of any to hear. You can find it both mornings and evenings.

See clandestine expert George Zeller's excellent article on Radio Caiman in *Free Air*, published by ACE. George relates the intriguing history of this station and presents some excellent theories about who is behind it. Caiman is the most widely heard of all clandestines, and also clandestine broadcasting's current greatest puzzle. In time I am convinced much of the Caiman story will be told, but for now it must remain a mystery.

The ACE bulletin is available for $16.00 a year from P.O. Box 46199, Baton Rouge, LA 70895-6199.

Virginia's Steve Rogovich has received his second QSL from Radio Garbanzo (the first appeared in our December column). Fearless Fred of Radio Garbanzo suggests that those seeking to hear the station check the area around 26.0 MHz late Saturday afternoons. Garbanzo feels 41 meters is too crowded for successful broadcasting.

Despite government efforts to the contrary, pirate radio is growing in Great Britain. There are now approximately 90 pirates broadcasting, with about 40 of these in the London area. Many of the London stations cater to ethnic audiences and may feature Greek or Turkish music as well as reggae and rock.

BBC Radio 1, which is government pop station, was shocked to find that in one poll it came in behind weekend-pirate Capital Radio. Our thanks to Pennsylvania's John Demmitt for sending us this item from the *Edmonton Journal*.

Some months ago we reported on some strange happenings in the vicinity of 13377 kHz. With the help of Dave White, Leo Schmidlin, John Demmitt, and others, we will have more to say about this next month.

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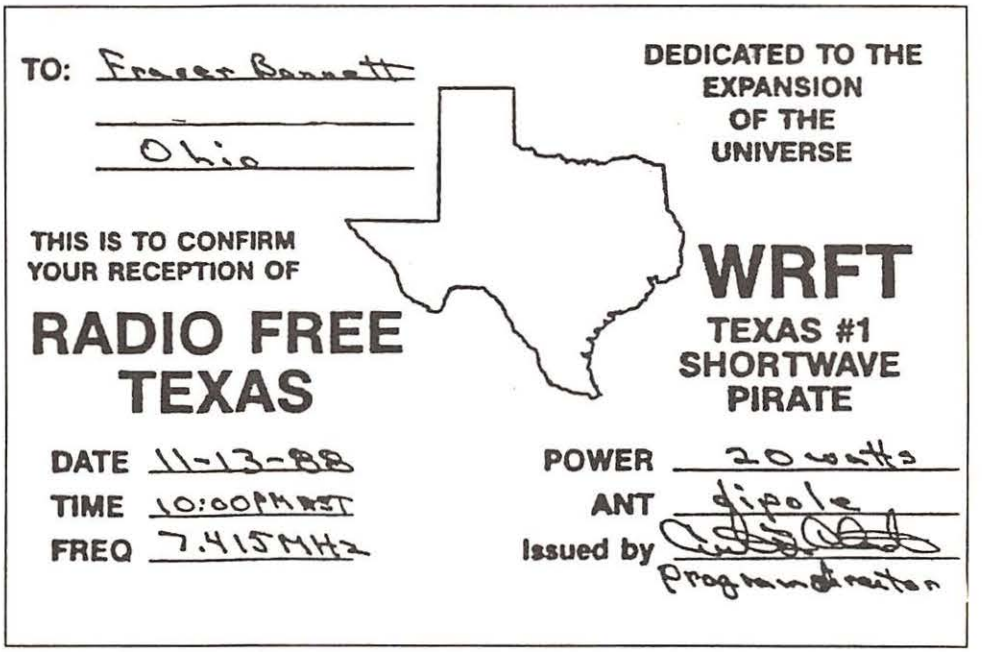


Fraser Bonnett received this QSL from widely-heard Radio Free Texas

consumer electronics

Doing Something About the Weather

Azimuth has recently released their TWR3 Weather Star personal weather station. It is an all-in-one weather station that allows you to predict the oncoming weather so that you can protect your antenna system and home. Now you can scan heavy wind gusts...-wind direction...Hi/Lo temp and more! Get your own computerized weather station at an affordable price.

Specifications: Size -- 2 1/2" x 1 1/2" x 1/2". Senses -- wind speed, wind direction, wind chill factor and temperature. Also allows you to view the highest and lowest wind gusts recorded at the touch of a button. The TWR3 allows you to convert Centigrade to Fahrenheit and kilometers to miles. It operates off either battery (see below) or AC power.

The TWR3 differs from its predecessor, the TW2, in that you only have to run one cable instead of two to your antenna.

The new TWR3 now has expanded capability to track "rainfall" on a daily and annual basis when used with the optional RG3 deluxe, self-dumping rain collector.

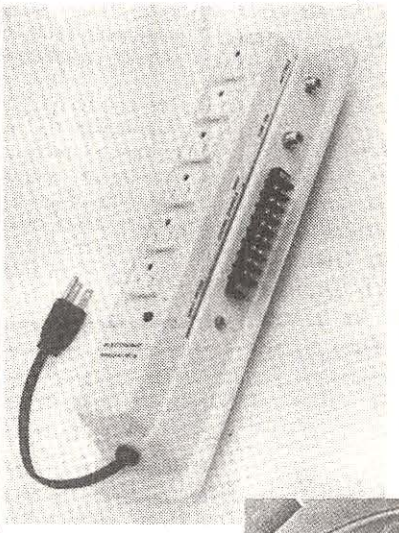
Overall, the TWR3 would be a welcome addition in your radio station.

PRICES:

Weather Temp Station	$159.95
Stainless Desk Stand	9.95
AC Power Adapter/Charger	9.95
Nicad Battery Pack (3 AAA)	7.95
40 ft. Extension Cable	14.95
Rain Collector/ self-dumping	49.95

Package Cost Analysis: The entire station and all its accessories costs $187.80. If you need to get in contact with Azimuth or want to order the TWR3 station, write or call Azimuth at:

Azimuth Communications
11030 Santa Monica Blvd.
Suite 100
Los Angeles, CA 90025
213-473-1332



Protect Your Satellites!

Electronic Specialists announces the introduction of their SATT-PRO in-home Satellite protection system for receiving and control equipment.

Designed for multi-function protection, SATT-PRO provides six filter/suppressor protected AC sockets for receiver, VCR, decoder, TVRO control unit, and cable or antenna control box. Spike/Surge protection is provided for eight control and sensor lines to the dish. Signal line Filter/Suppressor options include one or two TVRO and one or two TV VHF/UHF antenna or cable lines.

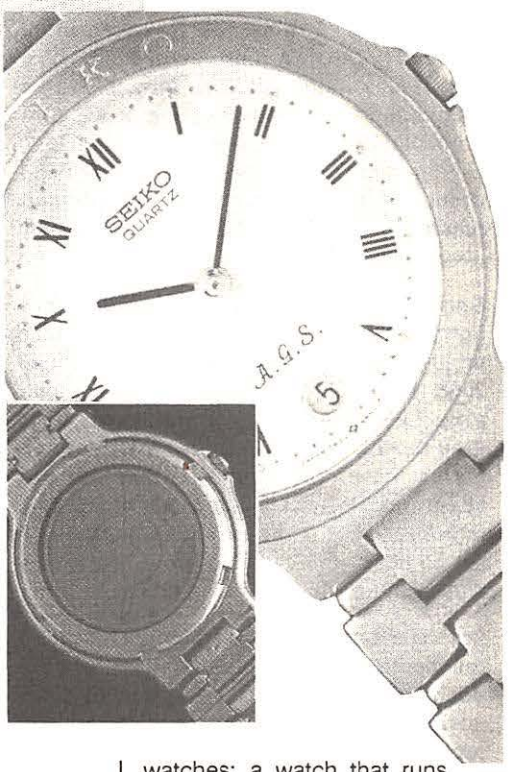
SATT-PRO II-36 offers a six AC socket protection, eight line control cable protection, TVRO cable (F connector) and TV VHF/UHF cable (F connector) protection.

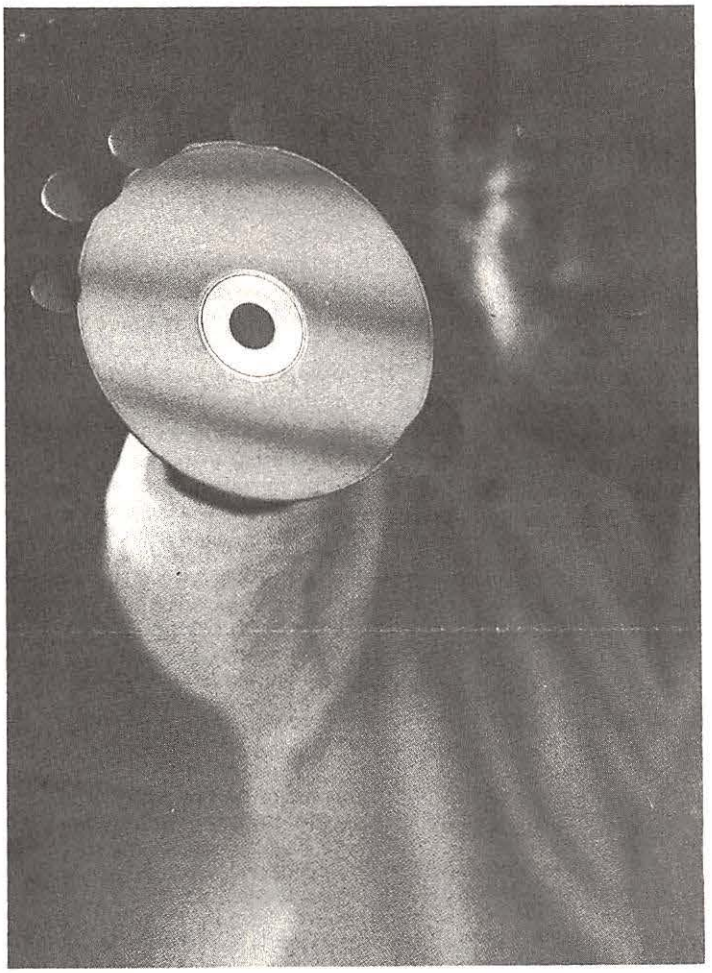
From stock, SATT-PRO II-36 lists for $240.00. For more information or ordering, write or call Electronic Specialists at:

Electronic Specialists, Inc.
171 South Main Street
Natick, Massachusetts 01760
800-225-4876

Wrist Watches in Action

Seiko has recently introduced an amazing new concept in watches; a watch that runs from the movements of the wearer's wrist. This new watch uses the world's smallest generator, rotating at speeds up to 100,000 revolutions per minute. Once the watch has been removed, it can run for up to 72 hours before it runs out of energy. Seiko's AGS (Automatic





Generating System) price begins at $375.00.

CD Recording

About a year ago, Tandy announced an item that would change the face of sound and computers, their THOR CD Recorder. The shiny blue disc can be used to store up to 550 megabytes of memory for computer. As for music, imagine being able to make perfect copies of your favorite songs!

The way the disc works is that the disc is first erased by a laser that smooths out the pits and bumps that represent the digital audio, then new pits and bumps are made.

Unfortunately, the process has not been perfected and a set date has not been made as to when this recorder will be out. The original price was set at $500.00, but that is not a definite figure at his point.

Loaning Out Your CDs?

Hi-ProTech has come out with a Compact Disc Marker. This device allows you to stamp your name and social security number onto the disc. You simply insert the disc, close the top, and seconds later your information is stamped. The IdentaDisc sells for $50.00. For ordering or information contact:

Hi-ProTech
Box 1357
Lansdale, Pa. 19446

Mark Your Calendars for

UNCLE SKIP'S FIRST ANNUAL "REAL RADIO" CONTEST

April 1, 1989
1400 to 2200 GMT

Don't be a fool! C'mon and have fun with Uncle Skip on April First!

Turn to page 41 for all the gory details!

To have your new product or book considered for review in Monitoring Times, send it to Editor, 140 Dog Branch Road, Brasstown, NC 28902.

Joe Woodlock

P.O. Box 98
Brasstown, NC 28902

Monitoring Maritime VLF

At the top end of the under 500 kHz band is a small area used by the maritime fixed and mobile services -- ships and coastal stations. Because of the highly directional aspects of low frequency, and the more limited range, these frequencies are not heavily used for long distance communications. They do, however, serve well for ships in or around a port near a coastal station.

If you are inland, chances are you won't hear many ships on these frequencies. You will probably catch some of the more local (U.S.) coastal stations plus a few others. But it is a little less crowded and you will have less interference between multiple transmissions on the same frequency.

Today, much of the ship/port communication is carried out in VHF. If it is in the normal high frequency ranges, it is usually conducted in single sideband (SSB). But the traffic and calls by maritime users in the low frequencies are in CW.

For those of you with RTTY readers, Morse Code poses no problem. For those without this aid to conversion, there are still opportunities for listening. Unlike many CW transmissions, coastal stations do follow some patterns. We will examine those a little later and show how you can listen for what you want to hear.

Up until a few years ago, the maritime portion of the low frequencies extended from just below 420 kHz to 500 kHz. Since that time, aeronautical beacons have taken over the portion up through 435 kHz. Initially, coastal stations were still heard on rare occasions using this portion of the band. More recently, this kind of invasion has been nonexistent. This was likely due to stations accidentally setting up for the wrong frequency. Thus, today the band is essentially from 436 to 500 kHz.

Listening Tips

It is most likely that you will hear the coastal stations at night, unless you are located very close to a particular coastal station. The range of low frequency increases during the hours of darkness and that is when this band is most used. You won't hear the steady stream of repetitive calls that are ordinarily in abundance on the other coastal bands. Many of the uses are for relatively brief periods. It might take some scanning of the band to turn up a transmission.

What will you hear? Many of the transmissions will be traffic lists. These are notifications to ships at sea that the station has a message for them. The ship then calls the coastal station (on a calling frequency) to get the message.

What does a traffic list sound like? It usually starts with CQ or V or perhaps both. Individual stations seem to have their own personalities about how they do this, but many will begin the transmission with either CQ CQ CQ or V V V. This is usually followed by DE. The CQ or V series alerts the listener that something is coming. The DE means "from."

If you tune in and hear 4-letter words being sent twice and in alphabetical order, you will know that you came in on a traffic list. ‡

It doesn't take too much practice to learn how to tell the CQ or V series and the DE. This is what I meant by listening for what you expect to hear. The next sounds are the key ones. These are the ID of the station. This may be sent only once or may be repeated for a total of three times.

After the ID, the station usually sends TFC LIST. Here again, practice will get you to recognize at least the TFC. You can be sure that LIST always follows it. This is followed by the list of ship IDs in alphabetical order. Each ID is repeated before going on to the next.

If you happen to tune in and hear 4-letter words being sent twice and in alphabetical order, you will know that you came in the middle of a traffic list. By listening for the beginning letter of each, you can estimate how far along the station is in its list. The IDs starting with numbers come after the Z group.

When the list is complete, the coastal station will again identify itself with its ID and probably send QRU. This means "I have a message for you." At that point the station may end its transmission.

If you listen on 500 kHz, things will be a little bit different. This is a calling frequency and an emergency channel. You could hear a distress call on this frequency. In this case, a coastal station might come in with a frequency for the ship to use with further information. You might hear a coastal station come in with the announcement of a traffic list. This would sound like the beginning of a traffic list, but after the TFC LIST would come the frequency to be used for the traffic list and, possibly, the time of the transmission.

One final suggestion. If you have a recorder, use it when you are DXing CW stations. That way you can go back and listen again if you need the extra listening to decipher one or more letters or words. It pays off in more completed loggings.

program guide

Sunday

March 5, 12, 19, 26

0008 Radio Canada International: Innovation Canada. A look at Canada's new ideas and technological developments.
0030 BBC: Composer of the Month. Profiles and music of famous composers.
0030 Radio Australia: Anything Goes. John Anderson with a musical smorgasbord.
0038 Radio Canada International: Coast to Coast. A look at the issues and opinions affecting Canadians.
0101 BBC: Play of the Week. Hour-long drama selections.
0108 Radio Canada International: SWL Digest. Ian MacFarland presents DX news and features.
0113 Radio Australia: Boomerang. Answers to listener enquiries about Radio Australia.
0130 Radio Australia: At Your Request. Dick Paterson plays listener requests.
0130 Radio Canada International: Music Spot. A look at the latest in popular music.
0138 Radio Canada International [Latin America]: Innovation Canada. See S 0008.
0138 Radio Canada International: Spotlight on Science. A look at developments in science and technology.
0209 BBC: British Press Review. Survey of editorial opinion in the British press.
0215 BBC: The Picture of Dorian Gray. A reading from the novel by Oscar Wilde (through April).
0230 BBC: The Ken Bruce Show. A mix of popular music and entertainment news.
0230 Radio Australia: Communicator. Report on developments in the communications world.
0237 Radio Netherlands: Newsline. News analysis from correspondents worldwide.
0252 Radio Netherlands: Over To You. A listener contact program with Dorothy Weirs.
0313 Radio Australia: Music of Radio Australia. Selections by Radio Australia announcers.
0315 BBC: From Our Own Correspondent. In-depth news stories from correspondents worldwide.
0330 BBC: Quiz Show. A topical quiz program.
0400 Radio Netherlands: Sunday Spotlight. A look at events and issues affecting Africa over the past week.
0430 BBC: From Old Time to New Country. Country music from past to present.
0430 Radio Australia: Arts Roundabout. Arts in Australia, past and present.
0445 BBC: Worldbrief. A 15-minute roundup of the week's news headlines and other events.
0509 BBC: Twenty-Four Hours. Analysis of the main news of the day.
0513 Radio Australia: Music of Radio Australia. See S 0313.
0530 BBC: Financial Review. A look back at the financial week.
0530 Radio Australia: At Your Request. See S 0130.
0537 Radio Netherlands: Newsline. See S 0237.
0540 BBC: Words of Faith. People share how their scripture gives meaning to their lives.
0545 BBC: Letter from America. Alistair Cooke's distinctly British view of America.
0552 Radio Netherlands: Over to You. See S 0252.
0630 BBC: Jazz for the Asking. Jazz music request show.
0630 Radio Australia: Education Issues. The future shape and direction of Australian education.
0630 Radio Netherlands: Sunday Spotlight. See S 0400.
0709 BBC: Twenty-Four Hours. See S 0509.
0713 Radio Australia: You Asked for It. Listener questions about Australia.
0730 BBC: From Our Own Correspondent. See S 0315.
0730 Radio Australia: Communicator. See S 0230.
0730 Radio Netherlands: Happy Station. Tom Meyer's family entertainment program with music and letters.
0745 BBC: Book Choice. Short reviews of current or future best-sellers.
0750 BBC: Waveguide. How to hear the BBC better.
1113 Radio Australia: Music of Radio Australia. See S 0313.
1115 BBC: From Our Own Correspondent. See S 0315.
1130 BBC: Composer of the Month. See S 0030.
1130 Radio Australia: International Top Hits. John Anderson with the week's big sounds.
1130 Radio Netherlands: Happy Station. See S 0730.
1201 BBC: Play of the Week. See S 0101.
1208 Radio Canada International: Innovation Canada. See S 0008.
1230 Radio Australia: Communicator. See S 0230.
1230 Radio Austria International: Letter from Austria. An overview of recent happenings in Austria with personal comment.
1235 Radio Austria International: Shortwave Panorama. A look at the world of communications today.
1250 Radio Austria International: Music for You. Austrian musical selections.
1300 Radio Norway International: Norway Today. A magazine program on issues and people affecting modern-day Norway.
1309 BBC: Twenty-Four Hours. See S 0509.
1313 Radio Australia: Smith's Weekly. Keith Smith's potpourri of news and views.
1330 BBC: Sports Roundup. The day's sports news.
1330 Radio Australia: Sports Results. Reports from Australian and international sporting events.
1345 BBC: Worldbrief. See S 0445.

MT Program Team

Kannon Shanmugam, Program Manager
4412 Turnberry Drive
Lawrence, KS 66046

Jim Frimmel, TX

Dale Vanderpoel, FL

Veronica Wilson hosts "Airtime Africa," Radio Netherland's magazine program for the African continent. It can be heard on Fridays at 1652 UTC.

LEGEND

* The first four digits of an entry are the program start time in UTC.
* The time is followed by the station name, program name, and a brief summary of the program's content.
* Some listings may be followed by "See X 0000." The letter stands for a day of the week:

S=Sunday M=Monday
T=Tuesday W=Wednesday
H=Thursday F=Friday
A=Saturday

The four digits stand for a time in UTC. Listeners should check back to that date and time to find out more about that particular program.

* All broadcasts are listed in chronological order, starting on Sunday at 0000 UTC and ending on Saturday at 2359 UTC.
* All days are in UTC. Remember that if you are listening in North American prime time, it is actually the next morning UTC. For example, if you are listening to a program at 7:01 pm [EST] on your Thursday night, that's equal to 0001 UTC and therefore Friday morning UTC.

We suggest that you tune in to a program a few minutes before the schedule start time, as some stations have tentative schedules which may slightly vary. We invite listeners and stations to send program information to the program manager at the address above.

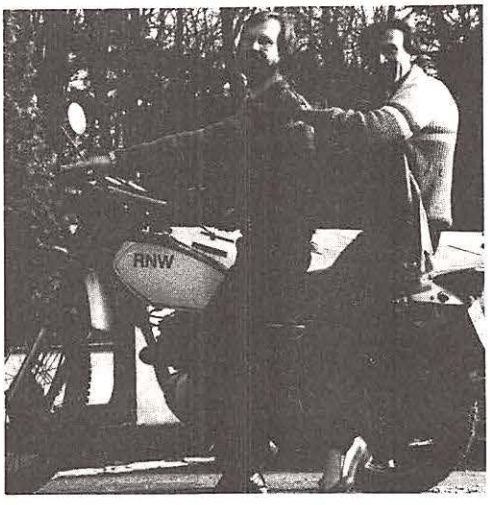
program guide

1345 Radio Australia: Music of Radio Australia. See S 0313.
1400 Radio Norway International: Norway Today. See S 1300.
1401 BBC: Straight to the Top. A series of phone-ins with world leaders (through March 12).
1404 Radio Canada International: Sunday Morning. A three-hour magazine program, covering virtually everything under the sun.
1430 BBC: Anything Goes. Sounds from the BBC archives as requested by listeners. (from March 19).
1430 Radio Australia: Innovations. Australian inventions, innovative practices and processes.
1430 Radio Netherlands: Happy Station. See S 0730.
1513 Radio Australia: Matters of Faith. Doctrines and beliefs of the Pacific basin.
1515 BBC: Classical Music. Programs to be heard include "International Recital" (through March 19) and "Concert Hall" (from March 26).
1530 Radio Australia: An Expo Selection. Readings of entries in the Expo short story competition.
1600 Radio Norway International: Norway Today. See S 1300.
1615 BBC: Feature. Programming on various subjects.
1630 Radio Australia: Music of Radio Australia. See S 0313.
1630 Radio Netherlands: Happy Station. See S 0730.
1645 BBC: Letter from America. See S 0545.
1645 Radio Australia: Sports Results. See S 1330.
2300 Radio Canada International: SWL Digest. See S 0108.
2309 BBC: Book Choice. See S 0745.
2313 Radio Australia: Music of Radio Australia. See S 0313.
2315 BBC: Letter from America. See S 0545.
2330 BBC: Straight to the Top. See S 1401 (through March 12).
2330 Radio Australia: Monitor. News about scientific, medical, and technological developments.

Monday

March 6, 13, 20, 27

0000 Radio Norway International: Norway Today. See S 1300.
0004 Radio Canada International: The House. A drama program.
0030 BBC: In Praise of God. A half-hour program of worship.
0030 Radio Australia: Music of Radio Australia. See S 0313.
0101 BBC: Feature. Programming on various subjects.
0108 Radio Canada International: Listeners' Corner. Ian MacFarland and Francoise Borel present listener comments and music requests.
0113 Radio Australia: Window on Australia. A look at people and places all over the nation.
0130 Radio Australia: This Australia. Documentaries about the land "down under".
0145 BBC: The Intimate Brahms. A look at the classical composer Brahms.
0209 BBC: British Press Review. See S 0209.
0215 BBC: Andy Kershaw's World of Music. Exotic and innovative music from the world over.



Pete Meyers (right) hops on the Radio Netherlands "Rembrandt Express," a magazine program which can be heard on Fridays at 0752 UTC, repeated on Saturdays at 0252 and 0552 UTC.

0230 BBC: Science in Action. The latest in scientific developments.
0230 Radio Australia: International Country Music. The latest country chart makers and top albums.
0230 Radio Netherlands: Happy Station. See S 0730.
0313 Radio Australia: Music of Radio Australia. See S 0313.
0315 BBC: Feature. Programming on various subjects.
0330 BBC: Anything Goes. See S 1430.
0330 Radio Australia: Sports Results. See S 1330.
0345 Radio Australia: Music of Radio Australia. See S 0313.
0400 Radio Norway International: Norway Today. See S 1300.
0407 Radio Netherlands: Newsline. See S 0237.
0425 Radio Australia: Propagation Report. Mike Bird with the shortwave weather report.
0430 BBC: Reading. A serialized story or novel, as adapted for radio.
0430 Radio Australia: Country Australia. News and information about agricultural and primary industries.
0445 BBC: Nature Now. Information about flora, fauna, and natural resources.
0445 Radio Australia: Music of Radio Australia. See S 0313.
0500 Radio Norway International: Norway Today. See S 1300.
0509 BBC: Twenty-Four Hours. See S 0509.
0513 Radio Australia: Music of Radio Australia. See S 0313.
0530 BBC: Waveguide. See S 0750.
0530 Radio Australia: Southern Cross Sketches. Barry Seeber examines and documents changes in Australia since European settlement.
0530 Radio Netherlands: Happy Station. See S 0730.
0540 BBC: Words of Faith. See S 0540.
0545 BBC: Recording of the Week. A personal choice from the latest classical music releases.
0630 BBC: Straight to the Top. See S 1401.
0630 Radio Australia: Pacific Sunrise. Business and export developments in the Pacific.
0637 Radio Netherlands: Newsline. See S 0237.
0709 BBC: Twenty-Four Hours. See S 0509.
0713 Radio Australia: Window on Australia. See M 0113.
0730 BBC: Feature. See S 1615.
0730 Radio Australia: Along the Mighty Murray. People, places, and events encountered

NEWS GUIDE

This is your guide to news broadcasts on the air. All broadcasts are daily unless otherwise noted by brackets. These brackets enclose day codes denoting days of broadcast. The codes are as follows:

S= Sunday
M= Monday
T= Tuesday
W=Wednesday
H= Thursday
F= Friday
A= Saturday

We invite listeners and stations to send program information to the program manager.

0000 BBC: Newsdesk
0000 Kol Israel: News
0000 KYOI: News [M-F]
0000 Radio Australia: International Report
0000 Radio Canada International: News [S-M]
0000 Radio Canada International: World at Six [T-A]
0000 Radio Jamahiriya, Libya: News
0000 Radio Moscow: News
0000 Spanish Foreign Radio: News
0000 Voice of America: News
0000 WCSN: News [T-F]
0030 Radio Canada International: As It Happens [T-A]
0030 Radio Canada International: News [S]
0030 Radio Kiev: News
0030 Voice of America (Special English): News
0030 WCSN: News [T-F]
0045 Radio Berlin International: News
0051 Spanish Foreign Radio: News Summary
0100 BBC: News Summary
0100 Deutsche Welle: World News
0100 Kol Israel: News
0100 KYOI: News [M-F]
0100 Radio Australia: World and Australian News
0100 Radio Berlin International: News
0100 Radio Canada International: News [S-M]
0100 Radio Japan: News
0100 Radio Moscow: News
0100 Radiotelevisione Italiana: News
0100 Spanish Foreign Radio: News
0100 Voice of America: News
0100 WCSN: News [T-F]
0130 WCSN: News [T-F]

along Australia's greatest river.
0737 Radio Netherlands: Newsline. See S 0237.
0752 Radio Netherlands: The Research File. A science and technology review, covering the latest discoveries and developments.
1113 Radio Australia: Music of Radio Australia. See S 0313.
1115 BBC: Health Matters. Latest developments in medicine and advice on how to stay fit and well.
1130 BBC: The Ken Bruce Show. See S 0230.
1130 Radio Australia: Soundabout. Contemporary music for young people.
1137 Radio Netherlands: Newsline. See S 0237.
1152 Radio Netherlands: The Research File. See M 0752.
1204 Radio Canada International: North Country. News, current affairs, and rebroadcasts of other programs.
1215 BBC: My Music. A quiz show on - you guessed it - music!
1225 Radio Australia: Propagation Report. See M 0425.
1230 Radio Australia: Education Issues. See S 0630.
1245 BBC: Sports Roundup. See S 1330.
1309 BBC: Twenty-Four Hours. See S 0509.
1313 Radio Australia: Window on Australia. See M 0113.
1330 BBC: Feature. See S 1615.
1330 Radio Australia: Sports Results. See S 1330.
1330 Radio Canada International: North Country. See M 1204.
1345 Radio Australia: Music of Radio Australia. See S 0313.
1405 BBC: Outlook. An excellent magazine (i.e., covering everything!) program.
1425 Radio Australia: Stock Exchange Report. Financial news from the Pacific.
1430 Radio Australia: Music of Radio Australia. See S 0313.
1437 Radio Netherlands: Newsline. See S 0237.
1445 BBC: The Picture of Dorian Gray. See S 0215.
1452 Radio Netherlands: The Research File. See M 0752.
1513 Radio Australia: Window on Australia. See M 0113.
1515 BBC: Feature. See M 0101.
1530 Radio Australia: Monitor. See S 2330.
1615 BBC: Reading. See M 0430.
1625 Radio Australia: Stock Exchange Report. see M 1425.
1627 Radio Australia: Propagation Report. See M 0425.
1630 BBC: Health Matters. See M 1115.
1630 Radio Australia: Music of Radio Australia. See S 0313.
1637 Radio Netherlands: Newsline. See S 0237.
1645 BBC: The World Today. News analysis on a selected location or event in the news.
1645 Radio Australia: Sports Results. See S 1330.
1652 Radio Netherlands: The Research File. See M 0752.
2308 Radio Canada International: Spectrum. A wide-ranging magazine program.
2309 BBC: Commentary. Background to the news from a wide range of specialists.
2313 Radio Australia: Window on Australia. See M 0113.
2315 BBC: The Learning World. An international survey of education around the world.
2330 BBC: Multitrack 1: Top 20. What's hot on the British pop music charts.
2330 Radio Australia: Arts Roundabout. See S 0430.

Tuesday

March 7, 14, 21, 28

0030 BBC: Megamix. A compendium of music, sport, fashion, health, travel, news and views for young people.
0030 Radio Australia: Music of Radio Australia. See S 0313.
0101 BBC: Outlook. See M 1405.
0113 Radio Australia: Window on Australia. See M 0113.
0125 BBC: Financial News. News of commodity prices and significant moves in currency and stock markets.
0130 BBC: Feature. Programming on various subjects.
0130 Radio Australia: Education Issues. See S 0630.
0145 BBC: Europe's World. A magazine program reflecting life in Europe and its links with other parts of the world.
0209 BBC: British Press Review. See S 0209.

Deutsche Welle's varied staff. Deutsche Welle broadcasts in English three times daily to North America at 0100, 0300, and 0500 UTC.

0151 Radio Veritas Asia: World News [M-F]
0151 Spanish Foreign Radio: News Summary
0200 BBC: World News
0200 Deutsche Welle: World News
0200 Kol Israel: News
0200 KYOI: News [M-F]
0200 Radio Australia: International Report
0200 Radio Berlin International: News
0200 Radio Canada International: As It Happens [T-A]
0200 Radio Moscow: News
0200 Radio RSA: News
0200 Swiss Radio International: News
0200 Voice of America: News
0200 Voice of Free China: News and Commentary
0200 WCSN: News [T-F]
0215 BBC (South Asia): Newsreel
0215 Radio Cairo: News
0230 Radio Netherlands: News [T-S]
0230 Radio Portugal: News [T-A]
0230 WCSN: News [T-F]
0245 Radio Berlin International: News
0300 BBC: World News
0300 Deutsche Welle: World News
0300 KYOI: News [M-F]
0300 Radio Australia: World and Australian News
0300 Radio Berlin International: News
0300 Radio Japan: News
0300 Radio Moscow: News
0300 Radio RSA: News
0300 Voice of America: News
0300 Voice of Free China: News and Commentary
0300 WCSN: News [T-F]
0309 BBC: News About Britain
0315 Radio Cairo: News
0330 Radio Finland: Northern Report [T-A]
0330 WCSN: News [T-F]
0350 Radiotelevisione Italiana: News
0400 BBC: Newsdesk
0400 Deutsche Welle: World News
0400 KYOI: News [M-F]
0400 Radio Australia: International Report
0400 Radio Berlin International: News
0400 Radio Moscow: News
0400 Radio Netherlands: News [M-A]
0400 Radio RSA: News
0400 Swiss Radio International: News
0400 Voice of America: News
0400 WCSN: News [M-F]
0425 Radiotelevisione Italiana: News
0430 WCSN: News [T-F]
0445 Radio Berlin International: News
0500 BBC: World News
0500 Deutsche Welle: World News
0500 KYOI: News [M-F]

program guide

0215 BBC: Network UK. A look at the issues and events that affect the lives of people throughout the UK.
0230 BBC: Sports International. Feature program on a topic or person making sports headlines.
0230 Radio Australia: On Our Selection. Michael Wagner's magazine show.
0237 Radio Netherlands: Newsline. See S 0237.
0252 Radio Netherlands: The Research File. See M 0752.
0313 Radio Australia: Music of Radio Australia. See S 0313.
0315 BBC: The World Today. See M 1645.
0330 BBC: John Peel. Tracks from newly released albums and singles from the contemporary music scene.
0330 Radio Australia: Sports Results. See S 1330.
0345 Radio Australia: Music of Radio Australia. See S 0313.
0407 Radio Netherlands: Newsline. See S 0237.
0425 Radio Australia: Propagation Report. See M 0425.
0430 BBC: The Learning World. See M 2315.
0430 Radio Australia: Business Horizons. Business and trade in Australia and neighboring regions.
0445 BBC: New Ideas. A radio shop window for new products and inventions.
0445 Radio Australia: Music of Radio Australia. See S 0313.
0455 BBC: Book Choice. See S 0745.
0509 BBC: Twenty-Four Hours. See S 0509.
0513 Radio Australia: Music of Radio Australia. See S 0313.
0530 BBC: Financial News. See T 0125.
0530 Radio Australia: On Our Selection. See T 0230.
0537 Radio Netherlands: Newsline. See S 0237.
0540 BBC: Words of Faith. See S 0540.
0545 BBC: The World Today. See M 1645.
0552 Radio Netherlands: The Research File. See M 0752.
0630 BBC: Musical Feature. A feature program concentrating on a music-related topic.
0630 Radio Australia: Music of Radio Australia. See S 0313.
0637 Radio Netherlands: Newsline. See S 0237.
0709 BBC: Twenty-Four Hours. See S 0509.
0713 Radio Australia: Window on Australia. See M 0113.
0730 BBC: Europe's World. See T 0145.
0730 Radio Australia: Monitor. See S 2330.
0737 Radio Netherlands: Newsline. See S 0237.
0745 BBC: Network UK. See T 0215.
0752 Radio Netherlands: Images. A cultural magazine, highlighting film, theatre, opera, books, and serious music.
1113 Radio Australia: Music of Radio Australia. See S 0313.
1115 BBC: Waveguide. See S 0750.
1125 BBC: Book Choice. See S 0745.
1130 BBC: Citizens. A radio soap opera, featuring the travails of five fictional Britons and their friends.
1130 Radio Australia: Soundabout. See M 1130.
1137 Radio Netherlands: Newsline. See S 0237.
1152 Radio Netherlands: Images. See T 0752.
1200 Radio Canada International: North Country. See M 1204.
1215 BBC: Multitrack 1: Top 20. See M 2330.
1225 Radio Australia: Propagation Report. See M 0425.
1230 Radio Australia: The Dutch Connection. A look at Dutch/Australian links over the past 400 years.
1245 BBC: Sports Roundup. See S 1330.
1309 BBC: Twenty-Four Hours. See S 0509.
1313 Radio Australia: Window on Australia. See M 0113.
1330 BBC: Network UK. See T 0215.
1330 Radio Australia: Sports Results. See S 1330.
1330 Radio Canada International: North Country. See M 1204.
1345 BBC: Recording of the Week. See M 0545.
1345 Radio Australia: Music of Radio Australia. See S 0313.
1405 BBC: Outlook. See M 1405.
1425 Radio Australia: Stock Exchange Report. See M 1425.
1430 Radio Australia: Music of Radio Australia. See S 0313.
1437 Radio Netherlands: Newsline. See S 0237.
1445 BBC: The Intimate Brahms. See M 0145.
1452 Radio Netherlands: Images. See T 0752.
1513 Radio Australia: Window on Australia. See M 0113.
1515 BBC: A Jolly Good Show. Dave Lee Travis presents your record requests and dedications in his own unique way, including the Album of the Month.
1530 Radio Australia: The Dutch Connection. See T 1230.
1615 BBC: Omnibus. A half-hour program on practically any topic.
1625 Radio Australia: Stock Exchange Report. See M 1425.
1627 Radio Australia: Propagation Report. See M 0425.
1630 Radio Australia: Music of Radio Australia. See S 0313.
1637 Radio Netherlands: Newsline. See S 0237.
1645 BBC: The World Today. See M 1645.
1645 Radio Australia: Sports Results. See S 1330.
1652 Radio Netherlands: Images. See T 0752.
2309 BBC: Commentary. See M 2309.
2313 Radio Australia: Window on Australia. See M 0113.
2315 BBC: Classical Music. See S 1515.
2330 Radio Australia: Smith's Weekly. See S 1313.
2345 Radio Australia: Music of Radio Australia. See S 0313.

Bob Thomann and Bob Zanotti present "Swiss Shortwave Merry-Go-Round" on Swiss Radio International's Saturday broadcasts.

Wednesday

March 1, 8, 15, 22, 29

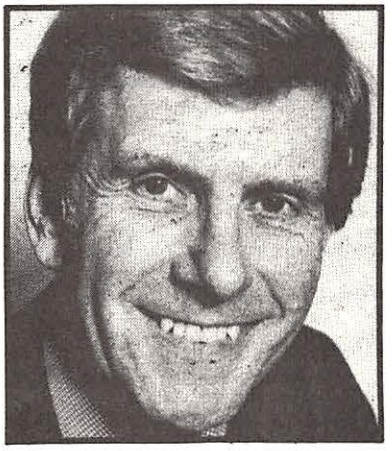
0030 BBC: Omnibus. See T 1615.
0030 Radio Australia: Music of Radio Australia. See S 0313.
0101 BBC: Outlook. See M 1405.
0113 Radio Australia: Window on Australia. See M 0113.
0125 BBC: Financial News. See T 0125.
0130 BBC: How It All Began. Keith Parsons looks at the origins of some of the major issues in the world.
0130 Radio Australia: The Dutch Connection. See

news guide cont'd from p.61

0500 Radio Australia: World and Australian News
0500 Radio Berlin International: News
0500 Radio Moscow: News
0500 Radio New Zealand International: News
0500 Voice of America: News
0500 WCSN: News [M-F]
0515 Radio Finland: Northern Report [T-A]
0530 Radio Netherlands: News [T-S]
0530 WCSN: News [T-F]
0600 BBC: Newsdesk
0600 Deutsche Welle: World News
0600 KYOI: News [M-F]
0600 Radio Australia: International Report
0600 Radio Moscow: News
0600 Voice of America: News
0600 WCSN: News [M-F]
0615 Radio Berlin International: News
0615 Radio Canada International: News [M-F]
0630 Radio Netherlands: News [M-A]
0630 Swiss Radio International: News
0630 WCSN: News [T-F]
0645 Radio Canada International: News [M-F]
0700 BBC: World News
0700 KYOI: News [M-F]
0700 Radio Australia: World and Australian News
0700 Radio Moscow: News
0700 Voice of Free China: News and Commentary
0700 WCSN: News [M-F]
0730 Radio Finland: Northern Report [T-A]
0730 Radio Netherlands: News [M-A]
0730 Swiss Radio International: News
0730 WCSN: News [T-F]
0745 Radio Berlin International: News
0800 BBC: World News
0800 KYOI: News [M-F]
0800 Radio Australia: International Report
0800 Radio Berlin International: News
0800 Radio Moscow: News
0830 Radio Netherlands: News [M-A]
0830 Swiss Radio International: News
0900 BBC: World News
0900 Deutsche Welle: World News
0900 KYOI: News [M-F]
0900 Radio Australia: World and Australian News
0900 Radio Finland: Northern Report [T-A]
0900 Radio Moscow: News
0930 Radio Canada International: News [M-F]
0930 Radio Finland: Northern Report [T-A]
1000 BBC: News Summary
1000 KYOI: News [M-F]

program guide

T 1230.
0145 BBC: Musical Feature. A feature program concentrating on a music-related topic.
0209 BBC: British Press Review. See S 0209.
0215 BBC: Health Matters. See M 1115.
0230 BBC: Citizens. See T 1130.
0230 Radio Australia: Anything Goes. See S 0030.
0237 Radio Netherlands: Newsline. See S 0237.
0252 Radio Netherlands: Images. See T 0752.
0313 Radio Australia: Music of Radio Australia. See S 0313.
0315 BBC: The World Today. See M 1645.
0330 BBC: Discovery. An in-depth look at scientific matters.
0330 Radio Australia: Sports Results. See S 1330.
0345 Radio Australia: Music of Radio Australia. See S 0313.
0407 Radio Netherlands: Newsline. See S 0237.
0425 Radio Australia: Propagation Report. See M 0425.
0435 BBC: Business Matters. A weekly survey of commercial and financial news.
0430 Radio Australia: Smith's Weekly. See S 1313.
0445 BBC: Musical Feature. See W 0145.
0445 Radio Australia: Music of Radio Australia. See S 0313.
0509 BBC: Twenty-Four Hours. See S 0509.
0513 Radio Australia: Music of Radio Australia. See S 0313.
0530 BBC: Financial News. See T 0125.
0530 Radio Australia: Interaction. An exploration of the activities and experiences of multicultural Australia.
0537 Radio Netherlands: Newsline. See S 0237.
0540 BBC: Words of Faith. See S 0540.
0545 BBC: The World Today. See M 1645.
0552 Radio Netherlands: Images. See T 0752.
0630 BBC: Meridian. The world of the arts, including music, drama, and books.
0630 Radio Australia: International Country Music. See M 0230.
0637 Radio Netherlands: Newsline. See S 0237.
0709 BBC: Twenty-Four Hours. See S 0509.
0713 Radio Australia: Window on Australia. See M 0113.
0730 BBC: Development '89. Aid and development issues.
0730 Radio Australia: The Dutch Connection. See T 1230.
0737 Radio Netherlands: Newsline. See S 0237.
0752 Radio Netherlands: Feature. A feature on the Dutch prison system is tentatively scheduled for this broadcast.
1113 Radio Australia: Music of Radio Australia. See S 0313.
1115 BBC: Musical Feature. See W 0145.
1130 BBC: Meridian. See W 0630.
1130 Radio Australia: Soundabout. See M 1130.
1137 Radio Netherlands: Newsline. See S 0237.
1152 Radio Netherlands: Feature. See W 0752.
1200 Radio Canada International: North Country. See M 1204.
1215 BBC: They Made Our World. A look at the people who have shaped our world, from Sir Francis Bacon to Henry Ford.
1225 BBC: The Farming World. Issues in agriculture.
1225 Radio Australia: Propagation Report. See M 0425.
1230 Radio Australia: Interaction. See W 0530.
1245 BBC: Sports Roundup. See S 1330.
1300 Radio Canada International: World Report. See M 1300.
1309 BBC: Twenty-Four Hours. See S 0509.
1313 Radio Australia: Window on Australia. See M 0113.
1330 BBC: Development '89. See W 0730.



Bob Holness presents "Anything Goes," a pgrogram of music and much more from the BBC World Service archives, on Sundays at 1430 UTC, repeated on Mondays at 0330 UTC.

1330 Radio Australia: Sports Results. See S 1330.
1330 Radio Canada International: North Country. See M 1204.
1345 Radio Australia: Music of Radio Australia. See S 0313.
1405 BBC: Outlook. See M 1405.
1425 Radio Australia: Stock Exchange Report. See M 1425.
1430 Radio Australia: Music of Radio Australia. See S 0313.
1437 Radio Netherlands: Newsline. See S 0237.
1445 BBC: Business Matters. See W 0430.
1452 Radio Netherlands: Feature. See W 0752.
1513 Radio Australia: Window on Australia. See M 0113.
1515 BBC: The Learning World. See M 2315.
1530 BBC: King Street Junior. Serialized drama about life in a city primary school (except 1st: Two Cheers for February, a satirical look back at the month just past).
1530 Radio Australia: Along the Mighty Murray. See M 0730.
1615 BBC: Musical Feature. See T 0630.
1625 Radio Australia: Stock Exchange Report. See M 1425.
1627 Radio Australia: Propagation Report. See M 0425.
1630 Radio Australia: Music of Radio Australia. See S 0313.
1637 Radio Netherlands: Newsline. See S 0237.
1645 BBC: The World Today. See M 1645.
1645 Radio Australia: Sports Results. See S 1330.
1652 Radio Netherlands: Feature. See W 0752.
2309 BBC: Commentary. See M 2309.
2313 Radio Australia: Window on Australia. See M 0113.
2315 BBC: Feature. See M 0315.
2330 BBC: Multitrack 2. Mitchell Johnson presents pop music and news.
2330 Radio Australia: You Asked For It. See S 0713.
2345 Radio Australia: Music of Radio Australia. See S 0313.

Thursday

March 2, 9, 16, 23, 30

0030 BBC: King Street Junior (except 2nd: Two Cheers for February). See W 1530.
0030 Radio Australia: Music of Radio Australia. See S 0313.
0101 BBC: Outlook. See M 1405.

1000 Radio Australia: International Report
1000 Radio Berlin International: News
1000 Radio Moscow: News
1000 Radio New Zealand International: News [M-F]
1000 Swiss Radio International: News
1000 Voice of America: News
1030 KYOI: News [T-F]
1030 Radio Netherlands: News [M-A]
1030 Voice of America (Special English): News [S]
1100 BBC: World News
1100 Deutsche Welle: World News
1100 Kol Israel: News
1100 KYOI: News [M-F]
1100 Radio Australia: World and Australian News
1100 Radio Berlin International: News
1100 Radio Moscow: News
1100 Radio New Zealand International: News
1100 Radio RSA: News
1100 Swiss Radio International: News
1100 Voice of America: News
1109 BBC: News About Britain
1130 KYOI: News [T-F]
1130 Radio Netherlands: News [M-A]
1130 Voice of America (Special English): News [M-F]
1200 BBC: News Summary [S]
1200 BBC: Newsreel [M-A]
1200 KYOI: News [M-F]
1200 Radio Australia: International Report
1200 Radio Canada International: News [M-A]
1200 Radio Finland: Northern Report [T-F]
1200 Radio Moscow: News
1200 Voice of America: News
1215 Radio Berlin International: News
1230 KYOI: News [T-F]
1230 Radio Berlin International: News
1300 BBC: World News
1300 KYOI: News [M-F]
1300 Radio Australia: World and Australian News
1300 Radio Berlin International: News
1300 Radio Canada International: World Report [M-F]
1300 Radio Finland: Northern Report [T-F]
1300 Radio Moscow: News
1300 Swiss Radio International: News
1300 Voice of America: News
1330 KYOI: News [T-F]
1330 Swiss Radio International: News
1330 Voice of America (Special English): News
1345 Radio Berlin International: News
1400 BBC: News Summary [S]
1400 BBC: World News [M-F]
1400 KYOI: News [M-F]

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0113 Radio Australia: Window on Australia. See M 0113.
0125 BBC: Financial News. See T 0125.
0130 BBC: Waveguide. See S 0750.
0130 Radio Australia: Interaction. See W 0530.
0140 BBC: Book Choice. See S 0745.
0145 BBC: Society Today. A weekly look at the changes in Britain.
0209 BBC: British Press Review. See S 0209.
0215 BBC: Network UK. See T 0215.
0230 BBC: Assignment. A weekly examination of a topical issue.
0230 Radio Australia: Music of Radio Australia. See S 0313.
0237 Radio Netherlands: Newsline. See S 0237.
0252 Radio Netherlands: Feature. See W 0752.
0313 Radio Australia: Music of Radio Australia. See S 0313.
0315 BBC: The World Today. See M 1645.
0330 BBC: My Music. See M 1215.
0330 Radio Australia: Sports Results. See S 1330.
0345 Radio Australia: Music of Radio Australia. See S 0313.
0407 Radio Netherlands: Newsline. See S 0237.
0425 Radio Australia: Propagation Report. See M 0425.
0430 BBC: Society Today. See H 0145.
0430 Radio Australia: Innovations. See S 1430.
0445 BBC: Andy Kershaw's World of Music. See M 0215.
0509 BBC: Twenty-Four Hours. See S 0509.
0513 Radio Australia: Music of Radio Australia. See S 0313.
0530 BBC: Financial News. See T 0125.
0530 Radio Australia: This Australia. See M 0130.
0537 Radio Netherlands: Newsline. See S 0237.
0540 BBC: Words of Faith. See S 0540.
0545 BBC: The World Today. See M 1645.
0552 Radio Netherlands: Feature. See W 0752.
0630 BBC: They Made Our World. See W 1215.
0630 Radio Australia: Anything Goes. See S 0030.
0637 Radio Netherlands: Newsline. See S 0237.
0640 BBC: The Farming World. See W 1225.
0709 BBC: Twenty-Four Hours. See S 0509.
0713 Radio Australia: Window on Australia. See M 0113.
0730 BBC: Write On... Paddy Feeny with correspondence and listeners' questions.
0730 Radio Australia: Word of Mouth. Oral histories of Australians.
0737 Radio Netherlands: Newsline. See S 0237.
0745 BBC: Network UK. See T 0215.
0745 Radio Australia: Music of Radio Australia. See S 0313.
0752 Radio Netherlands: Media Network. A weekly survey of communications developments around the globe.
1113 Radio Australia: Music of Radio Australia. See S 0313.
1115 BBC: New Ideas. See T 0445.
1125 BBC: Book Choice. See S 0745.
1130 BBC: Citizens. See T 1130.
1130 Radio Australia: Soundabout. See M 1130.
1137 Radio Netherlands: Newsline. See S 0237.
1152 Radio Netherlands: Media Network. See H 0752.
1200 Radio Canada International: North Country. See M 1204.
1215 BBC: Multitrack 2. See W 1830.
1225 Radio Australia: Propagation Report. See M 0425.
1230 Radio Australia: Business Horizons. See T 0430.
1245 BBC: Sports Roundup. See S 1330.
1245 Radio Australia: Music of Radio Australia. See S 0313.
1309 BBC: Twenty-Four Hours. See S 0509.
1313 Radio Australia: Window on Australia. See M 0113.
1330 BBC: Network UK. See T 0215.
1330 Radio Australia: Sports Results. See S 1330.
1330 Radio Canada International: North Country. See M 1204.
1345 BBC: Folk in Britain [2nd, 16th, 30th] or Jazz Scene UK [9th, 23rd]. A look at folk or jazz music on the British Isles.
1345 Radio Australia: Music of Radio Australia. See S 0313.
1405 BBC: Outlook. See M 1405.
1425 Radio Australia: Stock Exchange Report. See M 1425.
1430 Radio Australia: Music of Radio Australia. See S 0313.
1437 Radio Netherlands: Newsline. See S 0237.
1445 BBC: Write On... See H 0730.
1452 Radio Netherlands: Media Network. See H 0752.
1513 Radio Australia: Window on Australia. See M 0113.
1515 BBC: The Pleasure's Yours. Gordon Clyde presents classical music requests.
1530 Radio Australia: Arts Roundabout. See S 0430.
1615 BBC: Assignment. See H 0230.
1625 Radio Australia: Stock Exchange Report. See M 1425.
1627 Radio Australia: Propagation Report. See M 0425.
1630 Radio Australia: Music of Radio Australia. See S 0313.

In addition to his "Masterpiece Theatre" duties, Alistair Cooke presents a distinctly British view of American life in "Letter from America," which airs on the BBC World Service Sundays at 0515 UTC, repeated later at 1645 UTC and 2315 UTC.

1637 Radio Netherlands: Newsline. See S 0237.
1645 BBC: The World Today. See M 1645.
1645 Radio Australia: Sports Results. See S 1330.
1652 Radio Netherlands: Media Network. See H 0752.
2309 BBC: Commentary. See M 2309.
2313 Radio Australia: Window on Australia. See M 0113.
2315 BBC: Music Now. Geoffrey Norris presents modern classical music.
2330 Radio Australia: Book Readings. Serialized readings from popular books.
2340 BBC: At Home With... Paddy Feeny visits the homes of British sporting personalities.
2345 Radio Australia: Boomerang. See S 0113.

Friday

March 3, 10, 17, 24, 31

0030 BBC: Musical Feature. A feature program

news guide cont'd from p. 63

1400 Radio Australia: International Report
1400 Radio Berlin International: News
1400 Radio Canada International: News [S]
1400 Radio Finland: Northern Report [T-A]
1400 Radio Moscow: News
1400 Radio RSA: News
1400 Voice of America: News
1430 Radio Netherlands: News [M-A]
1500 BBC: Newsreel
1500 Deutsche Welle: World News
1500 KYOI: News [M-F]
1500 Radio Australia: World and Australian News
1500 Radio Moscow: News
1500 Radio RSA: News
1500 Voice of America: News
1505 Radio Finland: Northern Report [T-A]
1527 Radio Veritas Asia: World News [M-A]
1530 Swiss Radio International: News
1545 Radio Berlin International: News
1545 Radio Canada International: News
1600 BBC: World News
1600 Deutsche Welle: World News
1600 Radio Australia: International Report
1600 Radio Berlin International: News
1600 Radio Moscow: News
1600 Voice of America: News
1600 WCSN: News [S-F]
1609 BBC: News About Britain
1630 Radio Netherlands: News [M-A]
1630 Voice of America (Special English): News
1630 WCSN: News [S-F]
1700 BBC: World News [S-F]
1700 Radio Australia: World and Australian News
1700 Radio Moscow: News
1700 Voice of America: News
1700 WCSN: News [S-F]
1715 Radio Berlin International: News
1715 Radio Canada International: News
1730 Radio Berlin International: News
1730 Radio New Zealand International: News [S-F]
1730 WCSN: News [S-F]
1800 BBC: Newsdesk
1800 KYOI: News [M-F]
1800 Radio Australia: International Report
1800 Radio Canada International: News
1800 Radio Moscow: News
1800 Radio New Zealand International: News
1800 Radio RSA: News
1800 Swiss Radio International: News
1800 Voice of America: News
1800 WCSN: News [S-F]

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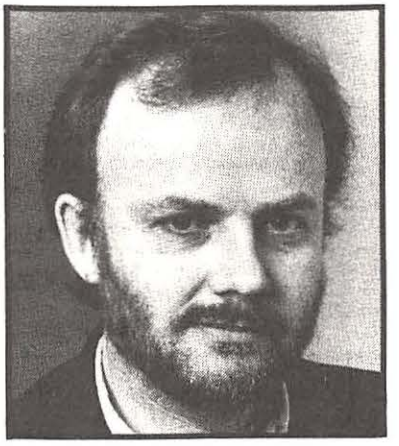
concentrating on a music-related topic.
0030 Radio Australia: Music of Radio Australia. See S 0313.
0101 BBC: Outlook. See M 1405.
0113 Radio Australia: Window on Australia. See M 0113.
0125 BBC: Financial News. See T 0125.
0130 BBC: Folk in Britain [3rd, 17th, 31st] or Jazz Scene UK [14th, 21st]. See H 1345.
0130 Radio Australia: Monitor. See S 2330.
0145 BBC: Profile. Character sketches of today's public figures.
0209 BBC: British Press Review. See S 0209.
0215 BBC: Seven Seas. A weekly program about ships and the sea.
0230 BBC: Citizens. See T 1130.
0230 Radio Australia: Music of Radio Australia. See S 0313.
0237 Radio Netherlands: Newsline. See S 0237.
0252 Radio Netherlands: Media Network. See H 0752.
0313 Radio Australia: Music of Radio Australia. See S 0313.
0315 BBC: The World Today. See M 1645.
0330 BBC: Focus on Faith. Comment and discussion on the major issues in the worlds of faith.
0330 Radio Australia: Sports Results. See S 1330.
0345 Radio Australia: Music of Radio Australia. See S 0313.
0407 Radio Netherlands: Newsline. See S 0237.
0425 Radio Australia: Propagation Report. See M 0425.
0430 BBC: Feature. Programming on various subjects.
0430 Radio Australia: Matters of Faith. See S 1513.
0445 BBC: Folk in Britain [3rd, 17th, 31st] or Jazz Scene UK [10th, 27th]. See H 1345.
0445 Radio Australia: Music of Radio Australia. See S 0313.
0509 BBC: Twenty-Four Hours. See S 0509.
0513 Radio Australia: Music of Radio Australia. See S 0313.
0530 BBC: Financial News. See T 0125.
0530 Radio Australia: The Dutch Connection. See T 1230.
0537 Radio Netherlands: Newsline. See S 0237.
0540 BBC: Words of Faith. See S 0540.
0545 BBC: The World Today. See M 1645.
0552 Radio Netherlands: Media Network. See H 0752.
0630 BBC: Meridian. See W 0630.
0630 Radio Australia: Australian Country Style. Local country music from Australia.
0637 Radio Netherlands: Newsline. See S 0237.
0709 BBC: Twenty-Four Hours. See S 0509.
0713 Radio Australia: Window on Australia. See M 0113.
0730 BBC: What Do Christians Believe? A look at the various beliefs of Christians the world over (through March 24).
0730 Radio Australia: Arts Roundabout. See S 0430.
0737 Radio Netherlands: Newsline. See S 0237.
0752 Radio Netherlands: Rembrandt Express. A magazine program with a "fresh dimension".
1113 Radio Australia: Music of Radio Australia. See S 0313.
1115 BBC: Profile. See F 0145.
1130 BBC: Meridian. See W 0630.
1130 Radio Australia: International Top Hits. See S 1130.
1137 Radio Netherlands: Asiascan. A live magazine show with interviews with newsmakers, press reviews, monthly quizzes and listener opinion.
1200 Radio Canada International: North Country. See M 1204.
1215 BBC: What Do Christians Believe? See F 0730.
1225 Radio Australia: Propagation Report. See M 0425.
1230 Radio Australia: Southern Cross Sketches. See M 0530.
1245 BBC: Sports Roundup. See S 1330.
1309 BBC: Twenty-Four Hours. See S 0509.
1313 Radio Australia: Window on Australia. See M 0113.
1330 BBC: John Peel. See T 0330.
1330 Radio Australia: Sports Results. See S 1330.
1330 Radio Canada International: North Country. See M 1204.
1345 Radio Australia: Music of Radio Australia. See S 0313.
1405 BBC: Outlook. See M 1405.
1425 Radio Australia: Stock Exchange Report. See M 1425.
1430 Radio Australia: Music of Radio Australia. See S 0313.
1437 Radio Netherlands: Asiascan. See F 1137.
1445 BBC: Nature Now. See M 0445.
1513 Radio Australia: Window on Australia. See M 0113.
1515 BBC: Music Now. See H 2315.
1530 Radio Australia: On Our Selection. See T 0230.
1545 BBC: At Home With... See H 2345.
1615 BBC: Science in Action. See M 0230.
1625 Radio Australia: Stock Exchange Report. See M 1425.
1627 Radio Australia: Propagation Report. See M 0425.
1630 Radio Australia: Music of Radio Australia. See S 0313.
1637 Radio Netherlands: Newsline. See S 0237.
1645 BBC: The World Today. See M 1645.
1645 Radio Australia: Sports Results. See S 1330.
1652 Radio Netherlands: Airtime Africa. Music, discussion with studio guests, and analysis of the issues that concern both Europe and Africa.
2309 BBC: Commentary. See M 2309.
2313 Radio Australia: Window on Australia. See M 0113.
2315 BBC: From The Weeklies. A review of the British weekly press.
2330 BBC: Multitrack 3. Sarah Ward presents innovative and alternative rock music.
2330 Radio Australia: The Dutch Connection. See T 1230.



John Peel presents "alternative rock music" from lesser-known groups in his program on the BBC World Service, appropriately titled, "John Peel." The program can be heard on Tuesdays at 0330 UTC, repeated on Fridays at 1330 UTC.

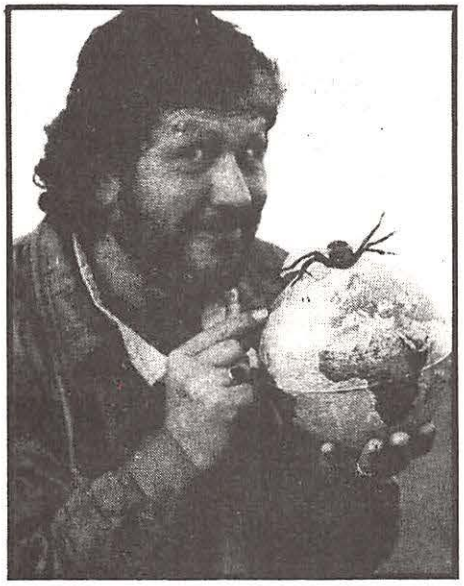
1803 Radio Jamahiriya, Libya: News Headlines
1830 Radio Kuwait: News
1830 Radio Netherlands: News [M-A]
1830 Radio New Zealand International: News [M-F]
1830 Swiss Radio International: News
1830 Voice of America (Special English): News
1830 WCSN: News [S-F]
1847 Radio Jamahiriya, Libya: News
1900 BBC: News Summary
1900 Deutsche Welle: World News
1900 KYOI: News [M-F]
1900 Radio Australia: World and Australian News
1900 Radio Canada International: News [M-F]
1900 Radio Moscow: News
1900 Radio New Zealand International: News
1900 Radio RSA: News
1900 Voice of America: News
1900 WCSN: News [S-F]
1915 Radio Berlin International: News
1930 Radio Canada International: News [M-F]
1930 Radio Finland: Northern Report [M-F]
1930 WCSN: News [S-F]
1935 Radiotelevisione Italiana: News
1945 Radio Berlin International: News
2000 BBC: World News
2000 Kol Israel: News
2000 KYOI: News [S-F]
2000 Radio Australia: International Report
2000 Radio Berlin International: News
2000 Radio Moscow: News
2000 Radio New Zealand International: News
2000 Radio RSA: News
2000 Voice of America: News
2000 WCSN: News [S-F]
2025 Radiotelevisione Italiana: News
2030 KYOI: News [M-H]
2030 Radio Netherlands: News [M-A]
2030 WCSN: News [S-F]
2100 BBC: News Summary
2100 Deutsche Welle: World News
2100 KYOI: News [S-F]
2100 Radio Australia: World and Australian News
2100 Radio Berlin International: News
2100 Radio Japan: News [S-F]
2100 Radio Moscow: News
2100 Swiss Radio International: News
2100 Voice of America: News
2100 WCSN: News [S-F]
2130 KYOI: News [M-H]
2130 Radio Canada International: News

program guide

Saturday

March 4, 11, 18, 25

0030 BBC: Personal View. Opinion on topical issues in British life.
0030 Radio Australia: Just Out. A look at recent Australian music releases.
0045 BBC: Recording of the Week. See M 0545.
0101 BBC: Outlook. See M 1405.
0113 Radio Australia: Book Readings. See H 2330.
0125 BBC: Financial News. See T 0125.
0130 BBC: Classical Record Review. Edward Greenfield reviews new releases.
0130 Radio Australia: Australian Country Style. See F 0630.
0145 BBC: Book Choice. See S 0745.



Dave Lee Travis has become rather a legend with his wacky pop music program on the BBC World service, "A Jolly Good Show." He's shown here with Freddie the Fly, a regular guest on the program, which can be heard on Tuesdays at 1515 UTC and on Saturdays at 2315 UTC.

0150 BBC: New Ideas. See T 0445.
0209 BBC: British Press Review. See S 0209.
0215 BBC: Network UK. See T 0215.
0230 BBC: People and Politics. Background to the British political scene.
0230 Radio Australia: The Dutch Connection. See T 1230.
0237 Radio Netherlands: Newsline. See S 0237.
0252 Radio Netherlands: Rembrandt Express. See F 0752.
0313 Radio Australia: You Asked For It. See S 0713.
0315 BBC: The World Today. See M 1645.
0330 BBC: The Vintage Chart Show. Past top ten hits with Jimmy Savile.
0330 Radio Australia: Music of Radio Australia. See S 0313.
0407 Radio Netherlands: Newsline. See S 0237.
0425 Radio Australia: Propagation Report. See M 0425.
0430 BBC: Here's Humph! All that jazz with Humphrey Lyttelton.
0430 Radio Australia: Monitor. See S 2330.
0445 BBC: Personal View. See A 0030.
0509 BBC: Twenty-Four Hours. See S 0509.
0513 Radio Australia: Music of Radio Australia. See S 0313.
0530 BBC: Financial News. See T 0125.
0530 Radio Australia: Along the Mighty Murray. See M 0730.
0537 Radio Netherlands: Newsline. See S 0237.
0540 BBC: Words of Faith. See S 0540.
0545 BBC: The World Today. See M 1645.
0552 Radio Netherlands: Rembrandt Express. See F 0752.
0630 BBC: Meridian. See W 0630.
0630 Radio Australia: Just Out. See A 0030.
0637 Radio Netherlands: Newsline. See S 0237.
0709 BBC: Twenty-Four Hours. See S 0509.
0713 Radio Australia: Country Australia. See M 0430.
0730 BBC: From The Weeklies. See F 2315.
0730 Radio Australia: Business Horizons. See T 0430.
0737 Radio Netherlands: Newsline. See S 0237.
0745 BBC: Network UK. See T 0215.
0745 Radio Australia: Music of Radio Australia. See S 0313.
0752 Radio Netherlands: Over To You. See S 0252.
1113 Radio Australia: Music of Radio Australia. See S 0313.
1115 BBC: Classical Record Review. See A 0130.
1130 BBC: Meridian. See W 0630.
1130 Radio Australia: Soundabout. See M 1130.
1130 Radio Austria International: Report from Austria. A magazine program.
1137 Radio Netherlands: Newsline. See S 0237.
1152 Radio Netherlands: Over to You. See S 0252.
1200 Radio Canada International: Canadian Journal. Recent events in Canada.
1215 BBC: Multitrack 3. See F 2330.
1225 Radio Australia: Propagation Report. See M 0425.
1230 Radio Australia: International Country Music. See M 0230.
1245 BBC: Sports Roundup. See S 1330.
1309 BBC: Twenty-Four Hours. See S 0509.
1313 Radio Australia: You Asked For It. See S 0713.
1330 BBC: Network UK. See T 0215.
1330 Radio Australia: Sports Results. See S 1330.
1345 BBC: From Old Time to New Country. See S 0430.
1345 Radio Australia: Book Readings. See H 2330.
1400 BBC: News Summary.
1401 BBC: The Ken Bruce Show. See S 0230.
1430 BBC: Sportsworld. Paddy Feeny presents live sports.
1430 Radio Australia: Boomerang. See S 0113.
1437 Radio Netherlands: Newsline. See S 0237.
1445 Radio Australia: Music of Radio Australia. See S 0313.
1452 Radio Netherlands: Over to You. See S 0252.
1513 Radio Australia: Country Australia. See M 0430.
1515 BBC: Sportsworld (continued). See A 1430.
1530 Radio Australia: This Australia. See M 0130.
1615 BBC: Sportsworld (continued). See A 1430.
1627 Radio Australia: Propagation Report. See M 0425.
1630 Radio Australia: Music of Radio Australia. See S 0313.
1637 Radio Netherlands: Newsline. See S 0237.
1645 Radio Australia: Sports Results. See S 1330.
1652 Radio Netherlands: Over to You. See S 0252.
2308 Radio Canada International: Innovation Canada. See S 0008.
2309 BBC: Book Choice. See S 0745.
2313 Radio Australia: Music of Radio Australia. See S 0313.
2315 BBC: A Jolly Good Show. See T 1515.
2330 Radio Australia: Innovations. See S 1430.

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2130 WCSN: News [S-F]
2200 BBC: Newshour
2200 KYOI: News [S-H]
2200 Radio Berlin International: News
2200 Radio Canada International [Asia]: News [M-F]
2200 Radio Canada International: News [A-S]
2200 Radio Canada International: World at Six [M-F]
2200 Radio Finland: Northern Report [M-F]
2200 Radio Moscow: News
2200 Radiotelevisione Italiana: News
2200 Voice of America: News
2200 Voice of Free China: News and Commentary
2200 WCSN: News [S-F]
2230 Kol Israel: News
2230 KYOI: News [M-H]
2230 Radio Canada International: As It Happens [M-F]
2230 Voice of America (Special English): News
2230 WCSN: News [S-F]
2245 Radio Berlin International: News
2300 BBC: World News
2300 KYOI: News [S-H]
2300 Radio Australia: World and Australian News
2300 Radio Berlin International: News
2300 Radio Canada International: News
2300 Radio Japan: News [S-F]
2300 Radio Moscow: News
2300 Radio New Zealand International: News
2300 Voice of America: News
2300 Voice of Turkey: News
2300 WCSN: News [S-F]
2330 KYOI: News [M-H]
2330 Radio New Zealand International: News [S-H]
2330 WCSN: News [S-F]
2333 Radio Jamahiriya, Libya: News Headlines
2335 Voice of Greece: News [S]

frequency section

MT Monitoring Team

EAST COAST:

Greg Jordan, Frequency Manager

1855-I Franciscan Terrace
Winston-Salem, NC 27127

Joe Hanlon, PA

WEST COAST:

Bill Brinkley, CA

Pete Wahlquist, CA

0000 UTC [7:00 PM EST/4:00 PM PST]

0000-0015		Voice of Kampuchea, Phnom-Penh	9693	11938		
0000-0030		BBC, London, England	5975	6005	6175	7325
			9590	9915	11945	11955
			12095	15260	17875	
0000-0030		Kol Israel, Jerusalem	7465	9435	9855	
0000-0030		Radio Korea (South), Seoul	15575			
0000-0030	M	Radio Norway Int'l, Oslo	9620	11845		
0000-0030		Radio Sofia, Bulgaria	9700	11950		
0000-0045		WINB, Red Lion, Pennsylvania	15295			
0000-0050		Radio Pyongyang, North Korea	15115	15160		
0000-0055		Radio Beijing, PR China	9665	9770	11715	
0000-0100		All India Radio, New Delhi	6055	7215	9535	9910
			11715	11745	15110	
0000-0100		CBC Northern Quebec Service	6195	9625		
0000-0100		CBN, St. John's, Newfoundland	6160			
0000-0100		CBU, Vancouver, British Colombia	6160			
0000-0100		CFCF, Montreal, Quebec	6005			
0000-0100		CFCN, Calgary, Alberta	6030			
0000-0100		CHNS, Halifax, Nova Scotia	6130			
0000-0100		CKWX, Vancouver, British Colombia	6080			
0000-0100		CFRB, Toronto, Ontario	6070			
0000-0100		FEBC, Manila, Philippines	15445			
0000-0100		(US) Far East Network, Tokyo	3910			
0000-0100		KSDA, Guam	15125			
0000-0100		KVOH, Rancho Simi, California	17775			
0000-0100		KYOI, Saipan	15405			
0000-0100		Radio Australia, Melbourne	15140	15160	15240	15320
			15395	17750	17795	21740
0000-0100		Radio Baghdad, Iraq	9515	11775		
0000-0100		Radio Canada Int'l, Montreal	5960	9755		
0000-0100		Radio Havana Cuba	9655			
0000-0100		Radio Luxembourg	6090			
0000-0100		Radio Moscow	7370	9790	9840	12010
			12045	15170	15295	17570
			17655	17675	17850	17860
			17880	17890	21790	
0000-0100		Radio Moscow N. America Service	6000	6045	7115	7150
			7215	7310	9765	9770
			15405	15420	17605	17720
			17700			
0000-0100		Radio New Zealand, Wellington	15150	17705		
0000-0100		Radio for Peace, Costa Rica	21555			
0000-0100		Radio Thailand, Bangkok	9655	11905		
0000-0100		SBC Radio One, Singapore	5010	5052	11940	
0000-0100		Spanish Foreign Radio, Madrid	9630	11880		
0000-0100	T-S	Superpower KUSW, Utah	15580			
0000-0100		Voice of America, Washington	5995	6130	9455	9775
			9815	11580	11695	11740
			15205	15290	17735	17820
			18157	USB		
0000-0100	T-A	Voice of Nicaragua, Managua	6100			
0000-0100		WCSN, Boston, Massachusetts	9850			
0000-0100		WHRI, Noblesville, Indiana	7365	9495		
0000-0100		WRNO, New Orleans, Louisiana	7355			
0000-0100		WSHB, Cyprus Creek, S. Carolina	11980			
0000-0100		WYFR, Oakland, California	5950	9505	15440	
0030-0045		BBC, London, England*	6195	7235	9570	11945
			15360	17875		
0030-0055	M-A	BRT, Brussels, Belgium	9925			
0030-0100		BBC, London, England	5975	6005	6175	7325
			9515	9580	9915	9590
			11955	12095	15260	
0030-0100		HCJB, Quito, Ecuador	9720	11775	11910	15155
0030-0100		Radio Austria Int'l, Vienna	9875			
0030-0100	T-S	Radio Budapest, Hungary	6110	9520	9585	9835
			11910	15160		
0030-0100		Radio Kiev, Ukrainian SSR	7165	7400	13645	15180
			15455			
0030-0100		SLBC, Colombo, Sri Lanka	6005	9720		
0035-0040		All India Radio, New Delhi	3925	4860		
0045-0100		Radio Berlin Int'l, E. Germany	6080	11890		
0045-0100		Radio Korea (South), Seoul	15575			
0045-0100	A	Radio New Zealand, Wellington	15150	17705		

LEGEND

* The first four digits of an entry are the broadcast start time in UTC. The second four digits represent the end time.
* In the space between the end time and the station name is the broadcast schedule.

S = Sunday M = Monday T = Tuesday W = Wednesday
H = Thursday F = Friday A = Saturday

If there is no entry, the broadcasts are heard daily. If, for example, there is an entry of "M," the broadcast would be heard only on Mondays. An entry of "M,W,F" would mean Mondays, Wednesdays and Fridays only. "M-F" would mean Mondays through Fridays. "TEN" indicates a tentative schedule and "TES" a test transmission.

* [ML] after a frequency indicates a multi-lingual transmission containing English-language programs.
* The last entry on a line is the frequency. Codes here include "SSB" which indicates a Single Sideband transmission, and "V" for a frequency that varies. [ML] after a frequency indicates a multi-lingual transmission containing English-language programs.
* v after a frequency indicates that it varies
* Notations of USB and LSB (upper and lower sideband transmissions) usually refer only to the individual frequency after which they appear.
* Listings followed by an asterisk (*) are for English lessons and do not contain regularly scheduled programming.

We suggest that you begin with the lower frequencies that a station is broadcasting on and work your way up the dial. Remember that there is no guarantee that a station will be audible on any given day. Reception conditions can change rapidly, though, and if it is not audible one night, it may well be on another.

HOW TO USE THE PROPAGATION CHARTS

Propagation charts can be an invaluable aid to the DXer in determining which frequencies are likely to be open at a given time. To use the propagation charts, choose those for your location (the are divided into east coast, midwest and west coast of North America). Then look for the one most closely describing the geographic location of the station you want to hear.

Once you've located the correct charts, look along the horizontal axis of the graph for the time that you are listening. The top line of the graph shows the Maximum Useable Frequency [MUF] and the lower line the Lowest Useable Frequency [LUF] as indicated on the vertical axis of the graph.

While there are exceptions to every rule (especially those regarding shortwave listening), you should find the charts helpful in determining the best times to listen for particular regions of the world. Good luck!

frequency section

0048-0100		WINB, Red Lion, Pennsylvania	15145			
0050-0100		Vatican Radio, Vatican City	6150	9605	11780	

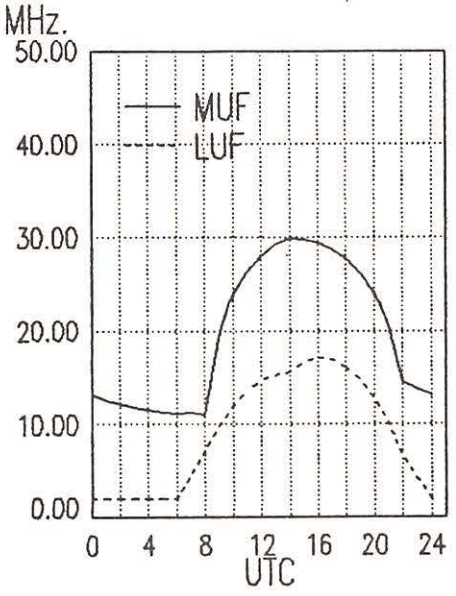
0100 UTC [8:00 PM EST/5:00 PM PST]

0100-0103	S	Port Moresby, Papua New Guinea	3295	4890	5960	5985
			6020	6040	6080	6140
			9520			
0100-0110		Vatican Radio, Vatican City	6150	9605	11780	
0100-0115		All India Radio, New Delhi	6055	7215	9535	9910
			11715	11745	15110	
0100-0120		RAI, Rome, Italy	9575	11800		
0100-0130		Kol Israel, Jerusalem	7465	9435	9855	
0100-0130		Radio Berlin Int'l, East Germany	6080	11890		
0100-0130		Radio Canada Int'l, Montreal	5960	9535	9755	11845
0100-0130		Radio Japan, Tokyo	11905	17810	17845	
0100-0130		Laotian National Radio	7113v			
0100-0130	S,M	WINB, Red Lion, Pennsylvania	15145			
0100-0145		Radio Yugoslavia, Belgrade	5980	9620	11735	
0100-0150		Deutsche Welle, West Germany	6040	6085	6145	9565
			9735	11865		
0100-0150		Radio Baghdad, Iraq	9515	11810		
0100-0155	S	Radio Austria Int'l, Vienna	9875			
0100-0200		BBC, London, England	5975	6005	6175	7325
			9410	9515	9590	9915
			11955	12095	15260	17815
0100-0200		CBC Northern Quebec Service	6195	9625		
0100-0200		CBN, St. John's, Newfoundland	6160			
0100-0200		CBU, Vancouver, British Colombia	6160			
0100-0200		CFCF, Montreal, Quebec	6005			
0100-0200		CFCN, Calgary, Alberta	6030			
0100-0200		CHNS, Halifax, Nova Scotia	6130			
0100-0200		CKWX, Vancouver, British Colombia	6080			
0100-0200		CFRB, Toronto, Ontario	6070			
0100-0200		(US) Far East Network, Tokyo	3910			
0100-0200		FEBC, Manila, Philippines	15445			
0100-0200		HCJB, Quito, Ecuador	9720	11755	11910	15155
0100-0200	T-A	KVOH, Rancho Simi, California	13695			
0100-0200		KYOI, Saipan	15405			
0100-0200		Radio Australia, Melbourne	15160	15180	15240	15320
			15395	17715	17795	
			17750	21740		
0100-0200		Radio Havana Cuba	6140	9655		
0100-0200		Radio Japan, Tokyo	11815	15195	17810	17845
0100-0200		Radio Luxembourg	6090			
0100-0200		Radio Moscow	17655	17685	17825	17850
			17860	17890	21790	
0100-0200		Radio Moscow, N. American Service	6000	6045	7115	7150
			7215	7310	9635	9700
			9720	12010	12050	15425
			17700	17720		
0100-0200		Radio New Zealand, Wellington	15150	17705		
0100-0200		Radio for Peace, Costa Rica	13660			
0100-0200		Radio Prague, Czechoslovakia	5930	6055	7345	9540
			9625	11990		
0100-0200		Radio Thailand, Bangkok	9655	11905		
0100-0200		RAE, Buenos Aires, Argentina	9690			
0100-0200		SBC Radio One, Singapore	5010	5052	11940	
0100-0200		SLBC, Colombo, Sri Lanka	6005	9720	15425	
0100-0200		Spanish Foreign Radio, Madrid	9630	11880		
0100-0200	T-S	Superpower KUSW, Utah	11695			
0100-0200		Voice of America, Washington	5995	6130	9455	9740
			9775	9815	11580	11740
			15205	17735	18157	USB
0100-0200		Voice of Indonesia, Jakarta	9680	11790		
0100-0200		WCSN, Boston, Massachusetts	9850			
0100-0200		WHRI, Noblesville, Indiana	7365	9495		
0100-0200		WRNO New Orleans, Louisiana	7355			
0100-0200		WSHB, Cyprus Creek, S. Carolina	11980			
0100-0200		WYFR, Oakland, California	5950	9505	9680	11715
			15440			
0130-0140	T-S	Voice of Greece, Athens	7430	9420	11645	
0130-0155		Radio Austria Int'l, Vienna	9875			
0130-0200		Radio Budapest, Hungary	6110	9520	9835	11910
			15160			
0130-0200	S,M	Radio Canada Int'l, Montreal	5960	9535	11845	11940
0130-0200		Radio Veritas Asia, Philippines	15330	15365		
0130-0200		WINB, Red Lion, Pennsylvania	15145			

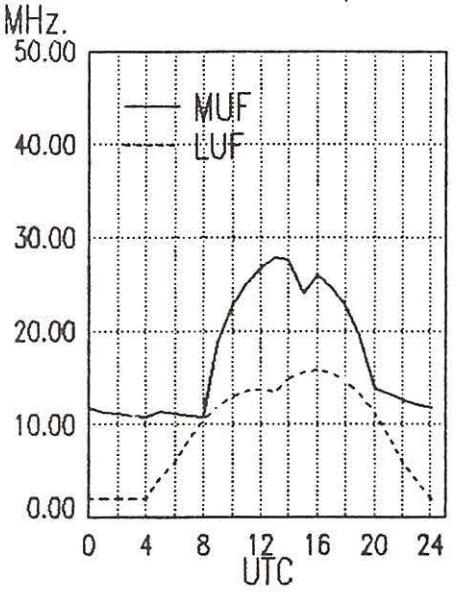
0200 UTC [9:00 PM EST/6:00 PM PST]

0200-0215		Vatican Radio, Vatican City	6145	7125	9650	
0200-0225		Kol Israel, Jerusalem	7465	9435	9855	
0200-0230		BBC, London, England	5975	6005	6175	7325
			9410	9515	9590	9915

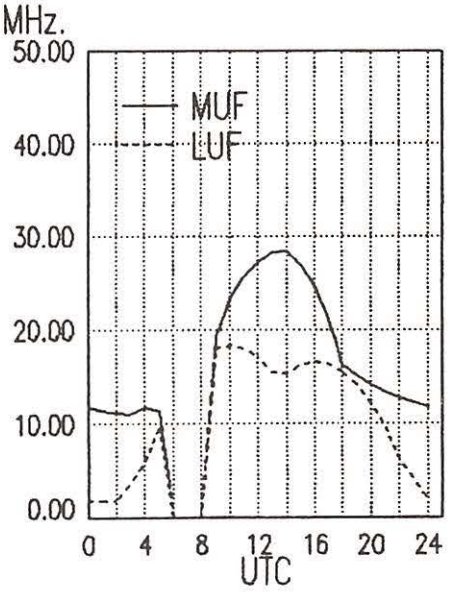
East Coast To
Western Europe



East Coast To
Eastern Europe



East Coast To
Middle East



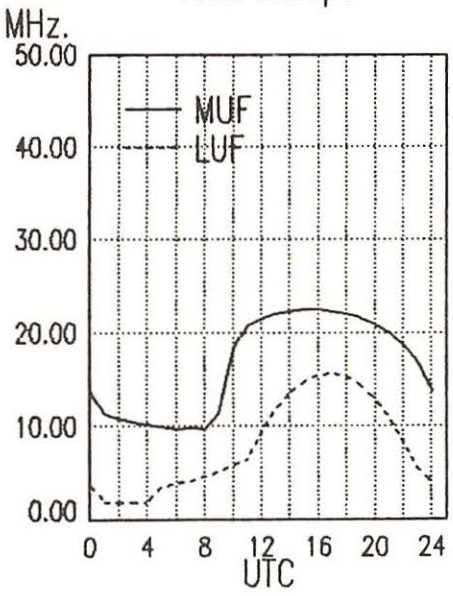
frequency section

			12095	15260		
0200-0230		Burma Bcasting Service, Rangoon	7185			
0200-0230	W,A	Radio Budapest, Hungary	6110	9520	9585	9835
			11910	15160		
0200-0230		Swiss Radio Int'l, Berne	6095	6135	9725	9885
			12035	17730		
0200-0230		WINB, Red Lion, Pennsylvania	15145			
0200-0245		Radio Berlin Int'l, E. Germany	6080	9730		
0200-0250		Deutsche Welle, West Germany	6035	7285	9690	11945
0200-0250		Radio Baghdad, Iraq	9515	11810		
0200-0250		Radio Bras, Brasilia, Brazil	11745v			
0200-0255		Radio Bucharest, Romania	5990	6155	9510	9570
			11830	11940		
0200-0300		CBC Northern Quebec Service	6195	9625		
0200-0300		CBN, St. John's, Newfoundland	6160			
0200-0300		CBU, Vancouver, British Colombia	6160			
0200-0300		CFCF, Montreal, Quebec	6005			
0200-0300		CFCN, Calgary, Alberta	6030			
0200-0300		CFRB, Toronto, Ontario	6070			
0200-0300		CHNS, Halifax, Nova Scotia	6130			
0200-0300		CKWX, Vancouver, British Colombia	6080			
0200-0300		(US) Far East Network, Tokyo	3910			
0200-0300		HCJB, Quito, Ecuador	9720	11775	15155	
0200-0300	A,S	KSDA, Guam	17865			
0200-0300	T-A	KVOH, Rancho Simi, California	13695			
0200-0300		KYOI, Saipan	17780			
0200-0300		Radio Australia, Melbourne	15320	17715	17795	
0200-0300		Radio Cairo, Egypt	9475	9675		
0200-0300		Radio Canada Int'l, Montreal	9535	9755	11845	11940
0200-0300		Radio Havana Cuba	6140	9655	9770	
0200-0300		Radio Luxembourg	6090			
0200-0300		Radio Moscow, USSR	6000	6045	7115	7150
			7215	7310	9700	9765
			15425			
0200-0300		Radio Moscow World Service	11845	12010	17570	17590
			17560	17655	17825	17890
			21690	21790		
0200-0300		Radio Orion, South Africa	3955			
0200-0300		Radio for Peace, Costa Rica	13660			
0200-0300	A	Radio New Zealand, Wellington	15150	17705		
0200-0300		Radio RSA, South Africa	9580	9615	11760	
0200-0300		Radio Thailand, Bangkok	9655	11905		
0200-0300		SBC Radio One, Singapore	5010	5052	11940	
0200-0300		SLBC, Colombo, Sri Lanka	6005	9720	15425	
0200-0300	T-S	Superpower KUSW, Utah	11695			
0200-0300		Trans World Radio, Bonaire	9535	11930		
0200-0300		Voice of America, Washington	5995	6035	7205	18157
			USB			
0200-0300		Voice of Asia, Taiwan	7285			
0200-0300		Voice of Free China, Taiwan	5985	9680	11740	15345
0200-0300		Voice of Kenya, Nairobi	6045			
0200-0300		WCSN, Boston, Massachusetts	9850			
0200-0300		WINB, Red Lion, Pennsylvania	15145			
0200-0300		WHRI, Noblesville, Indiana	7520	9495		
0200-0300		WRNO, New Orleans, Louisiana	7355			
0200-0300		WSHB, Cyprus Creek, S. Carolina	9745			
0200-0300		WYFR, Oakland, California	15440			
0200-0300	T-S	WYFR Satellite Net, California	5950	9505		
0213-0300		Radio France International, Paris	9790	9800	11670	13685
0215-0220		Radio Nepal, Kathmandu	5005	7165		
0230-0240		Port Moresby, Papua New Guinea	3925	4890	5960	5985
			6020	6040	6080	6140
			9520			
0230-0245	TWFS	Radio Budapest, Hungary	6110	9520	9585	9835
			11910	15160		
0230-0245		Radio Pakistan, Islamabad	7010	11570	15115	15580
			17660			
0230-0300		BBC, London, England	5975	6005	6175	7325
			9410	9515	9915	12095
			15260	15280		
0230-0300		Radio Netherland, Hilversum	6020	6165	9590	9895
0230-0300	T-A	Radio Portugal, Lisbon	6060	9600	9680	9705
			11840			
0230-0300		Radio Sweden, Stockholm	9695	11705	11950	SSB
0230-0300		Radio Tirana, Albania	7065	9760		
0240-0250		All India Radio, New Delhi	3905	4860	4880	4895
			5960	5990	6110	6120
			7195	7295	9550	9610
			11830	11870	15305	
0245-0300		Radio Berlin Int'l, E. Germany	11890	11785		
0245-0300		Radio Korea, Seoul, South Korea	9640	15575		

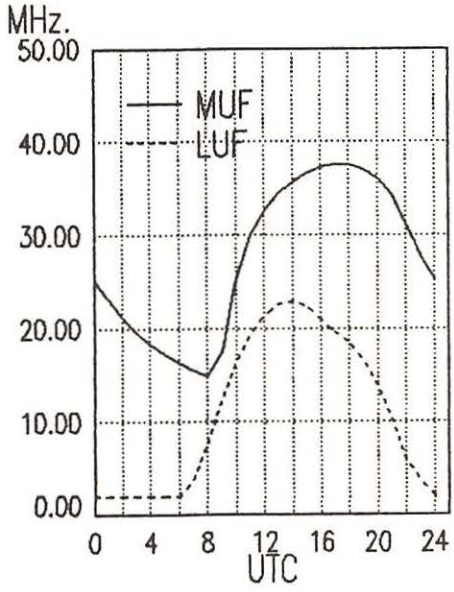
0300 UTC [10:00 PM EST/7:00 PM PST]

0300-0330		Radio Berlin Int'l, E. Germany	11785	11890

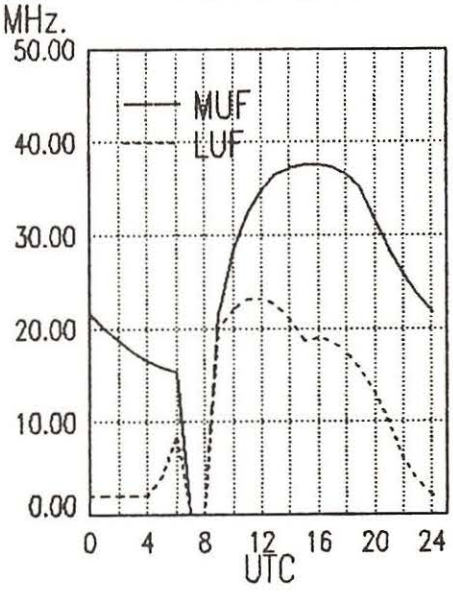
East Coast To
Artic Europe



East Coast To
West Africa



East Coast To
Central Africa



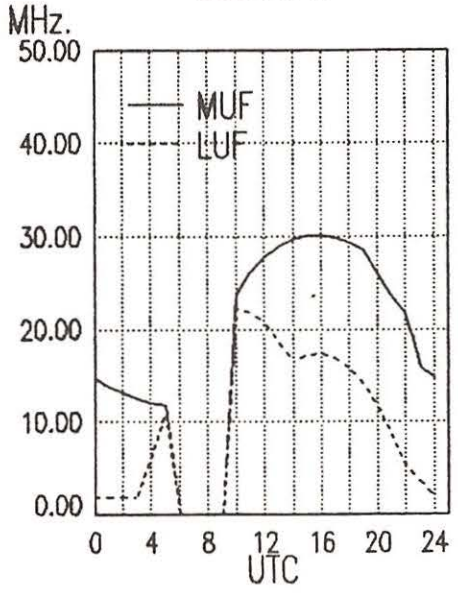
frequency section

0300-0330		Radio Kiev, Ukrainian SSR	7165	7335	7400	13645
			15180	15455		
0300-0330		WINB, Red Lion, Pennsylvania	15145			
0300-0307		Radio Pakistan, Islamabad	5090	5930	7095	
0300-0310		CBC Northern Quebec Service	6195	9625		
0300-0325		Radio Netherland, Hilversum	6020	6165	9590	9895
0300-0330		BBC, London, England	3955	5975	6005	6175
			7185	7325	9410	9660
			9915	11750	12095	15260
			15280	15420	17815	
0300-0330		Radio Cairo, Egypt	9475	9675		
0300-0330		Radio Japan, Tokyo	11870	15195	17765	17810
			17825	21610		
0300-0345	A	Radio New Zealand, Wellington	15150	17705		
0300-0350		Deutsche Welle, West Germany	6085	6185	9605	9700
0300-0355		Radio Beijing, PR China	9690	9770	11715	
0300-0400		CBN, St. John's, Newfoundland	6160			
0300-0400		CBU, Vancouver, British Colombia	6160			
0300-0400		CFCF, Montreal, Quebec	6005			
0300-0400		CFCN, Calgary, Alberta	6030			
0300-0400		CHNS, Halifax, Nova Scotia	6130			
0300-0400		CKWX, Vancouver, British Colombia	6080			
0300-0400		CFRB, Toronto, Ontario	6070			
0300-0400		(US) Far East Network, Tokyo	3910			
0300-0400		HCJB, Quito, Ecuador	9720	11775	15155	
0300-0400	T-A	KVOH, Rancho Simi, California	13695			
0300-0400		KYOI, Saipan	17780			
0300-0400		La Voz Evangelica, Honduras	4820			
0300-0400		Radio Australia, Melbourne	11945	15160	15240	15320
			15395	17715	17795	21740
0300-0400	T-A	Radio Canada Int'l, Montreal	9755	11845	11940	
0300-0400		Radio for Peace, Costa Rica	13663v			
0300-0400		Radio Havana Cuba	9655	6140	9770	
0300-0400		Radio Japan, Tokyo	5960	9645		
0300-0400		Radio Moscow, USSR	6000	6045	7115	7150
			7215	7310	9765	9635
			9895	15420	17700	
0300-0400		Radio Moscow World Service, USSR	15140	15200	17560	17570
			17590	17645	17655	17825
			17890	21690	21790	
0300-0400		Radio Prague, Czechoslovakia	5930	6055	7345	9540
			9625	11990		
0300-0400		Radio Thailand, Bangkok	9655	11905		
0300-0400		SBC Radio One, Singapore	5010	5052	11940	
0300-0400		SLBC, Colombo, Sri Lanka	6005	9720	15425	
0300-0400	T-S	Superpower KUSW, Utah	9815			
0300-0400		Trans World Radio, Bonaire	9535	11930		
0300-0400		Voice of America, Washington	5995	6035	9575	
0300-0400		Voice of Free China, Taiwan	5985	9680	11740	15345
0300-0400		Voice of Kenya, Nairobi	6045			
0300-0400		Voice of Nicaragua, Managua	6100			
0300-0400		WCSN, Boston, Massachusetts	9850			
0300-0400		WHRI, Noblesville, Indiana	7520	9495		
0300-0400		WRNO, New Orleans, Louisiana	7355			
0300-0400		WSHB, Cyprus Creek, N. Carolina	9745			
0300-0400		WYFR, Oakland, California	15440			
0300-0400		WYFR Satellite Net, California	5950	9505		
0310-0330		Vatican Radio, Vatican City	6150			
0313-0400		Radio France Int'l, Paris	3965	7135	7175	
			9550	9790	9800	11670
			11700	11995		
0330-0340	S-F	Port Moresby, Papua New Guinea	3925	4890	5960	5985
			6020	6040	6080	6140
			9520			
0330-0400		BBC, London, England	3955	5975	6005	6105
			6155	6175	6195	9410
			9915	11750	12095	17815
0330-0400		Radio Berlin Int'l, E. Germany	6125	6165	11750	
0330-0400		Radio Finland, Helsinki	9635	11755		
0330-0400	S,M	WINB, Red Lion, Pennsylvania	15145			
0335-0400		Radio New Zealand, Wellington	15150	17705		
0330-0400		Radio Tanzania, Dar es Salaam	9684			
0330-0400		Radio Tirana, Albania	7065	9760		
0330-0400		Radio Sweden, Stockholm	11705			
0330-0400		United Arab Emirates Radio	9640	11940	15435	17775
0335-0340		All India Radio, New Delhi	3905	4860	9610	11830
			11870	11890	15305	
0340-0350	M-A	Voice of Greece, Athens	7430	9395	9420	
0350-0400		RAI, Rome, Italy	9710	11905	15330	
0355-0400		Radio Yerevan, Armenian SSR	13645	15180	15455	

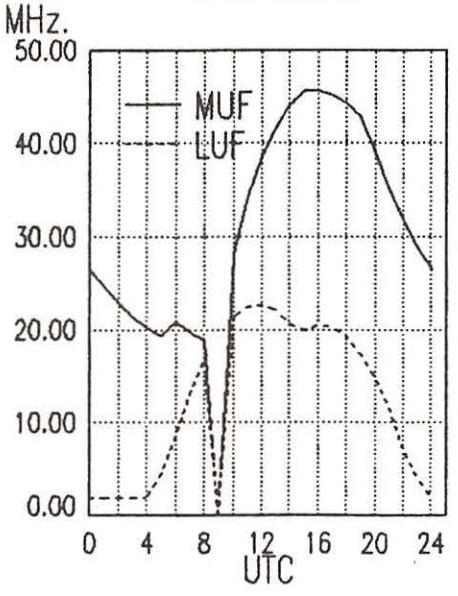
0400 UTC [11:00 AM EST/9:00 PM PST]

0400-0405		Radio Uganda, Kampala	4976	5026	
0400-0410		Radio Thailand, Bangkok	9655	11905	
0400-0410		RAI, Rome, Italy	9710	11905	15330

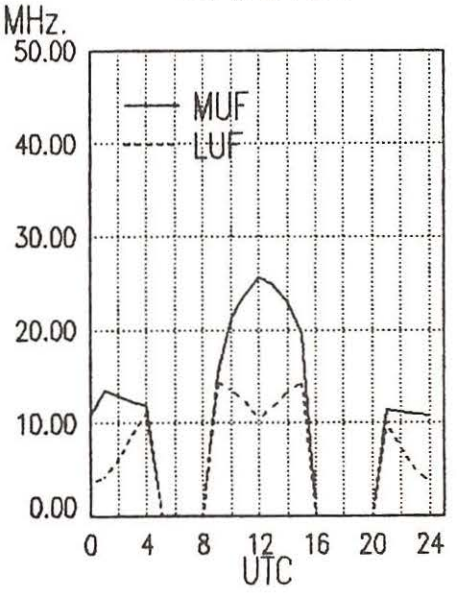
East Coast To
East Africa



East Coast To
South Africa



East Coast To
Central Asia



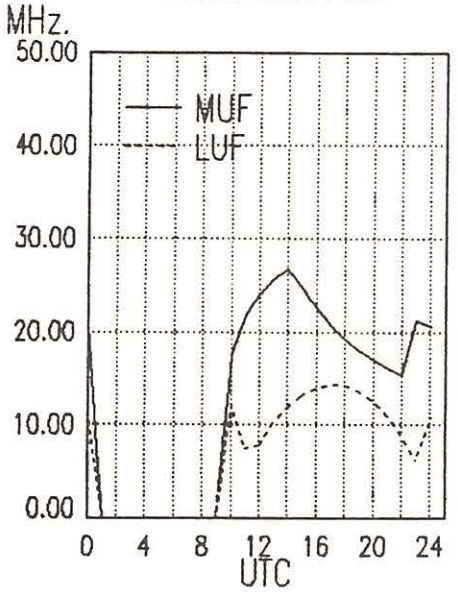
frequency section

0400-0415		Radio Berlin Int'l, E. Germany	6125	6165	11750	
0400-0415		Radio RSA, South Africa	7295	9585	11900	
0400-0420		Radio Botswana, Gabarone	4820			
0400-0420	T-S	Radio Zambia, Lusaka	3345	6165		
0400-0425		Radio Bucharest, Romania	6155	9510	9570	11830
			11940			
0400-0425		Radio Netherland, Hilversum	7210	9850		
0400-0430		BBC, London, England	3955	5975	6005	6155
			6175	6195	7105	7160
			7185	7260	9410	9580
			9600	9915	12095	
0400-0430		La Voz Evangelica, Honduras	4820			
0400-0430	S,M	Radio Austria Int'l, Vienna	6015	6155	15450	
0400-0430	M	Radio Norway Int'l, Oslo	9650	11750		
0400-0430		SLBC, Colombo, Sri Lanka	6005	9720	15425	
0400-0430		Radio Tanzania, Dar es Salaam	9684			
0400-0430		Swiss Radio Int'l, Berne	6135	9725	9885	12035
0400-0430		Trans World Radio, Bonaire	9535	11930		
0400-0430	S,M	WINB, Red Lion, Pennsylvania	15145			
0400-0445		Radio Berlin Int'l, E. Germany	9620	11785		
0400-0450		Deutsche Welle, West Germany	7150	7225	9565	9765
			11765			
0400-0450		Radio Pyongyang, North Korea	15160	15180		
0400-0450		Voice of Turkey, Ankara	9445	9680		
0400-0455		Radio Beijing, PR China	9645	11695	11980	
0400-0500		CBC Northern Quebec Service	6195	9625		
0400-0500		CBN, St. John's, Newfoundland	6160			
0400-0500		CBU, Vancouver, British Colombia	6160			
0400-0500		CFCF, Montreal, Quebec	6005			
0400-0500		CFCN, Calgary, Alberta	6030			
0400-0500		CHNS, Halifax, Nova Scotia	6130			
0400-0500		CKWX, Vancouver, British Colombia	6080			
0400-0500		CFRB, Toronto, Ontario	6070			
0400-0500		(US) Far East Network, Tokyo	3910			
0400-0500		FEBC, Manila, Philippines	11850			
0400-0500		HCJB, Quito, Ecuador	9720	11775	15155	
0400-0500		KYOI, Saipan	17780			
0400-0500		Radio Australia, Melbourne	11910	11945	15160	15240
			15320	17715	17795	
0400-0500		Radio for Peace, Costa Rica	13660			
0400-0500		Radio Havana Cuba	5965	6035	6140	9655
			9770			
0400-0500		Radio Moscow, USSR	6000	7115	7165	7215
			7310	7370	11710	
0400-0500		Radio New Zealand, Wellington	15150	17705		
0400-0500		Radio Sofia, Bulgaria	7115			
0400-0500		SBC Radio One, Singapore	5010	5052	11940	
0400-0500	T-S	Superpower KUSW, Utah	9815			
0400-0500		Voice of America, Washington	3980	5995	6035	7280
			9575	11835	11925	15205
0400-0500		Voice of Kenya, Nairobi	6045			
0400-0500V		Voice of Nicaragua, Managua	6100			
0400-0500		WCSN, Boston, Massachusetts	9870			
0400-0500		WHRI, Noblesville, Indiana	7520	9495		
0400-0500		WRNO, New Orleans, Louisiana	6185			
0400-0500		WSHB, Cyprus Creek, S. Carolina	9455			
0400-0500		WYFR Satellite Net, California	5950	9520	13695	
0425-0440		RAI, Rome, Italy	5990	7275		
0430-0455		Radio Austria Int'l, Vienna	6015	6155	15410	
0430-0500		BBC, London, England	3955	5975	6005	7185
			9410	9510	9580	9600
			11945	12095	15070	15280
			15420	17815		
0430-0500		BBC, London, England*	7210	9750	11945	
0430-0500		Radio Tirana, Albania	9480	11835		
0430-0500	S,M	Trans World Radio, Bonaire	11930			
0430-0500		Trans World Radio, Swaziland	3205	7205		
0432-0500	A,M	FEBA, Seychelles	15325	17820	(irr)	
0445-0500		Radio Berlin Int'l, East Germany	9620	11785		

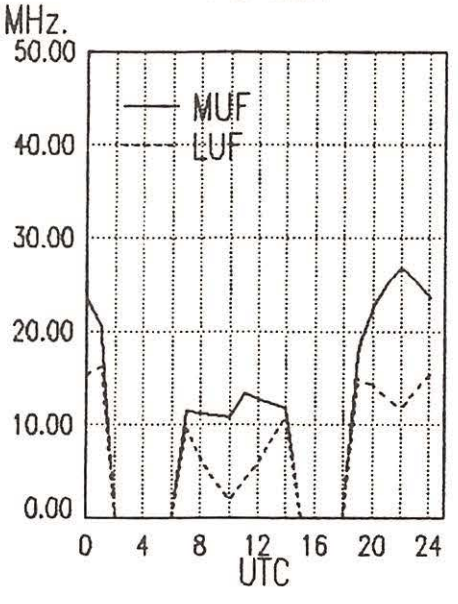
0500 UTC [12:00 AM EST/9:00 PM PST]

0500-0510		Radio Lesotho, Maseru	4800			
0500-0510	M-A	Radio Zambia, Lusaka	3345	6165		
0500-0515		GBC, Accra, Ghana	4915			
0500-0515		Kol Israel, Jerusalem	7460	9435	11588	
0500-0515		Vatican Radio, Vatican City	9645	15190		
0500-0530		Radio Berlin Int'l, East Germany	5965	9620	11785	
0500-0530	M	Radio Norway Int'l, Oslo	11745	15175		
0500-0530	S,M	Trans World Radio, Bonaire	9535	11930		
0500-0530		Trans World Radio, Swaziland	3205	5055	7210	
0500-0550		Deutsche Welle, West Germany	5960	6120	6130	9635
			9700			

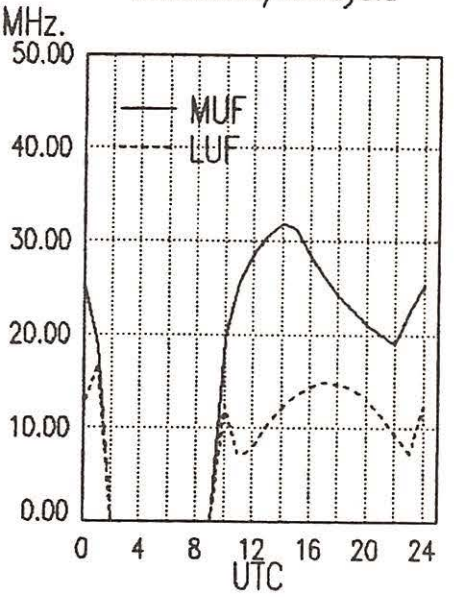
East Coast To
South East Asia



East Coast To
Far East



East Coast To
Indonesia/Malaysia



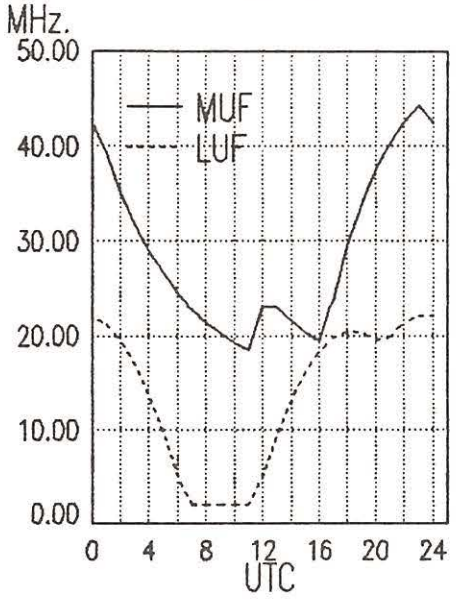
frequency section

0500-0555		Radio Beijing, China	9690			
0500-0600		BBC, London, England	5975	6005	6180	6195
			9410	9510	9580	12095
			15070	15120	15420	17815
			17885			
0500-0600		CBC Northern Quebec Service	6195	9625		
0500-0600		CBU, Vancouver, British Colombia	6160			
0500-0600		CFCF, Montreal, Quebec	6005			
0500-0600		CFCN, Calgary, Alberta	6030			
0500-0600		CHNS, Halifax, Nova Scotia	6130			
0500-0600		CKWX, Vancouver, British Colombia	6080			
0500-0600		CFRB, Toronto, Ontario	6070			
0500-0600		(US) Far East Network, Tokyo	3910			
0500-0600		FEBC, Manila, Philippines	11850			
0500-0600		HCJB, Quito, Ecuador	6230	9720	11775	
0500-0600		KVOH, Rancho Simi, California	11960			
0500-0600		KYOI, Saipan	17780			
0500-0600		Radio Australia, Melbourne	11910	15160	15315	17795
0500-0600		Radio for Peace, Cost Rica	13660			
0500-0600		Radio Havana Cuba	5965	6035	9655	9770
0500-0600		Radio Japan, Tokyo	11870	17810		
0500-0600		Radio Kuwait	15345			
0500-0600		Radio Moscow, USSR	5905	7215	7310	7370
			15455			
0500-0600		Radio New Zealand, Wellington	15150	17705		
0500-0600		Radio Thailand, Bangkok	9655	11905		
0500-0600	S,M	Radio Zambia, Lusaka	11880			
0500-0600		SBC Radio One, Singapore	5010	5052	11940	
0500-0600		Spanish Foreign Radio, Madrid	9630			
0500-0600	S	Superpower KUSW, Utah	6175			
0500-0600	S	Swaziland Commercial Radio	6155	9705		
0500-0600		Voice of America, Washington	5995	6035	7170	7280
			9540	9575	15205	
0500-0600		Voice of Kenya, Nairobi	6045			
0500-0600	IRR	Voice of Nicaragua, Managua	6100			
0500-0600		Voice of Nigeria, Lagos	7255	15120	15185	
0500-0600		WCSN, Boston, Massachusetts	9870			
0500-0600		WINB, Red Lion, Pennsylvania	15145			
0500-0600		WHRI, Noblesville, Indiana	7520	9495		
0500-0600	M-A	WMLK, Bethel, Pennsylvania	9455			
0500-0600		WRNO, New Orleans, Louisiana	6185			
0500-0600		WSHB, Cyprus Creek, S. Carolina	9455			
0500-0600		WYFR Satellite Net, California	5950	11580	13695	
0510-0520		Radio Botswana, Gaborone	3356	4820	7255	
0527-0600	F	FEBA, Seychelles	17820			
0530-0545		BBC, London, England*	3990	6050	6140	7210
			9750			
0530-0555		Radio Bucharest, Romania	9640	11840	11940	15340
			15380	17720		
0530-0600		Radio Finland, Helsinki	6120	9635	11715	15185
0530-0600		Radio Netherland, Hilversum	6165	9715		
0530-0600		Radio Tirana, Albania	7300			
0530-0600		Trans World Radio, Swaziland	5055	7210		
0530-0600		UAE RAdio, United Arab Emirates	15435	17775	21700	
0555-0600		Ghana Broadcasting Corp., Accra	4915			
0555-0600		Voice of Malaysia, Kuala Lumpur	6175	9750	15295	

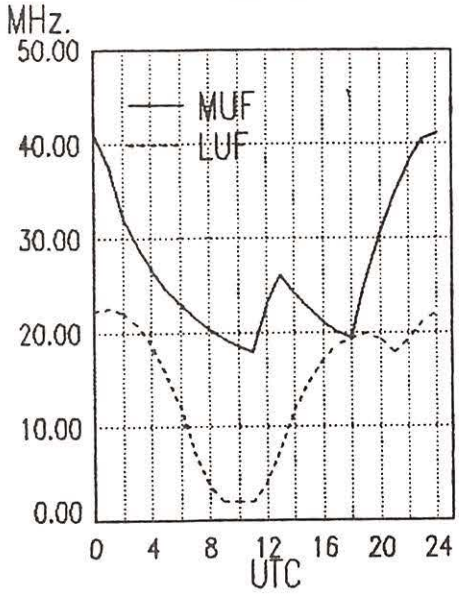
0600 UTC [1:00 AM EST/10:00 PM PST]

0600-0615		Radio Ghana, Accra	3366	4915		
0600-0615	M-A	Radio Zambia, Lusaka	6165	7235		
0600-0620		Vatican Radio, Vatican City	6185	9645		
0600-0625		Radio Netherlands, Hilversum	6165	9715		
0600-0630	F	FEBA, Mahe, Seychelles	17820			
0600-0630		Laotian National Radio	7113			
0600-0630		Radio Australia, Melbourne	11910	11945	15160	15240
			15315	15395	15425	17715
			17750			
			17795			
0600-0630		Radio Tirana, Albania	7300			
0600-0630		Trans World Radio, Swaziland	6070			
0600-0630		Voice of Kenya, Nairobi	6045			
0600-0645		Radio Berlin Int'l, East Germany	5965	6115	9645	11810
			13610			
0600-0645	S	Radio Cameroon, Yaounde	4850			
0600-0650		Deutsche Welle, West Germany	11765	13790	15185	17875
0600-0650		Radio Pyongyang, North Korea	13650	15160	15180	
0600-0700		BBC, London, England	5975	6005	6195	7105
			7150	7185	9410	9580
			9600	9640	11825	12095
			15070	15280		
0600-0700		CBC Northern Quebec Service	6195	9625		
0600-0700		CBU, Vancouver, British Colombia	6160			
0600-0700		CFCF, Montreal, Quebec	6005			
0600-0700		CFCN, Calgary, Alberta	6030			
0600-0700		CHNS, Halifax, Nova Scotia	6130			
0600-0700		CKWX, Vancouver, British Colombia	6080			

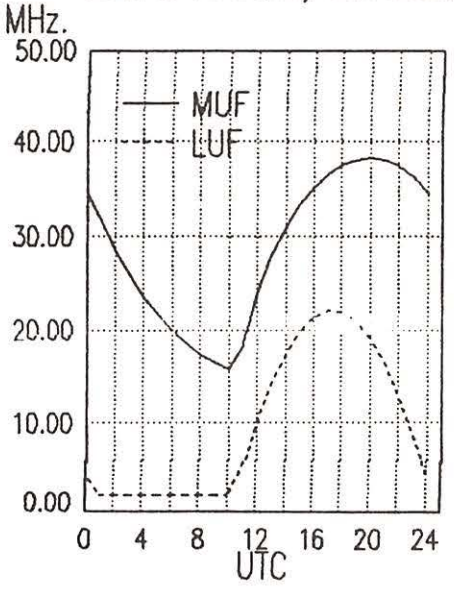
East Coast To Pacific



East Coast To Australia



East Coast To Central America/Carribean



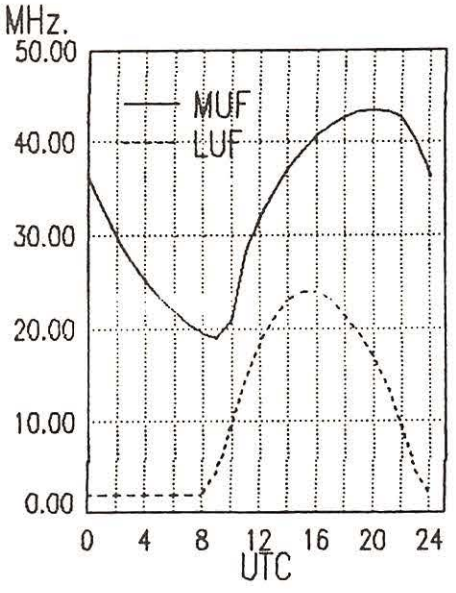
frequency section

0600-0700		CFRB, Toronto, Ontario	6070			
0600-0700		HCJB, Quito, Ecuador	6230	9720	11775	
0600-0700		(US) Far East Network, Tokyo	3910			
0600-0700		King of Hope, South Lebanon	6215			
0600-0700		KVOH, Rancho Simi, California	11960			
0600-0700		KYOI, Saipan	17780			
0600-0700		Radio Havana Cuba	9525	11760		
0600-0700		Radio Jordan, Amman	9560			
0600-0700		Radio Korea, Seoul, South Korea	6060	7275	9570	
0600-0700		Radio Kuwait	15345			
0600-0700		Radio Moscow, USSR	6175	7310	9765	12055
0600-0700		Radio New Zealand, Wellington	12045	17705		
0600-0700	A,S	Radio Thailand, Bangkok	9655	11905		
0600-0700		Radio Zambia, Lusaka	11880			
0600-0700		Radio 5, South Africa	11880			
0600-0700		SBC Radio One, Singapore	5010	5052	11940	
0600-0700	S	Superpower KUSW, Utah	6175			
0600-0700		Voice of America, Washington	5995	6035	6040	6080
			6125	7170	7200	7280
			7325	9530	9550	11805
0600-0700		Voice of Asia, Taiwan	7285			
0600-0700		Voice of Malaysia, Kuala Lumpur	6175	9750	15295	
0600-0700		Voice of Nicaragua, Managua	6100			
0600-0700		Voice of the Mediterranean	9765			
0600-0700		Voice of Nigaria, Lagos	15185			
0600-0700		WCSN, Boston, Massachusetts	7365			
0600-0700		WHRI, Noblesville, Indiana	6100	9495		
0600-0700	M-A	WMLK, Bethel, Pennsylvania	9455			
0600-0700		WSHB, Cyprus Creek, S. Carolina	9455			
0600-0700		WYFR, Oakland, California	11580			
0600-0700		WYFR Satellite Net, California	5950	7355	9680	
			9852.5			
0615-0630	M-F	Radio Canada Int'l, Montreal	6055	6140	7155	9740
			9760	11840	15325	
0615-0630	M-A	Vatican Radio, Vatican City	15190	17730		
0615-0700		Radio Berlin Iny'l, E. Germany	15240	17775		
0625-0700		Trans World Radio Monte Carlo	7105			
0630-0700		AWR, Forli, Italy	7125			
0630-0700	A	CPBS-1, China*	11330	15550	15590	17605
0630-0655		Radio Netherland, Hilversum	9895	11930		
0630-0700		Radio Australia, Melbourne	11945	15160	15240	15315
			15395	15425	17715	17750
			17795			
0630-0700		Radio Bucharest, Romania	21600			
0630-0700		Radio Polonia, Warsaw, Poland	6135	7270	15120	
0630-0700		Radio Tirana, Albania	7205	9500		
0630-0700		Swiss Radio Int'l, Berne	12030	15430	17570	
0630-0700		Trans World Radio, Swaziland	5055	6070	7210	9725
0630-0700	A,S	Voice of Kenya, Nairobi	7270			
0645-0700		BBC, London, England*	6150	7260	11945	
0645-0700		Radio Berlin Int'l, East Germany	15240	17880	21540	21645
0645-0700	M-F	Radio Canada Intl, Montreal	6050	6140	7155	9740
			9760	11840	15325	
0645-0700		Radio Ghana, Accra	6130			
			11705	11800		
0645-0700		Radio Bucharest, Romania	11940	15250	15335	17790
			17805	21665		

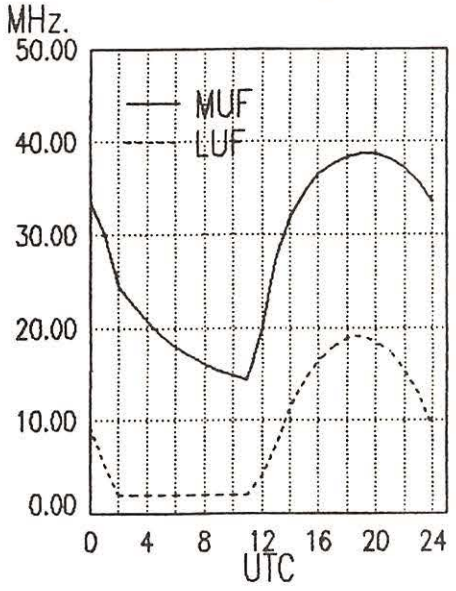
0700 UTC [2:00 AM EST/11:00 PM PST]

0700-0703		Port Moresby, Papua New Guinea	3925	4890	5960	5985
			6020	6040	6080	6140
			9520			
0700-0710		Radio Bucharest, Romania	11825	11940	15250	15335
			17790	17805	21665	
0700-0710		Radio Sierra Leone, Freetown	5980			
0700-0715		Radio Ghana (HS), Accra	3366	4915		
0700-0730		BBC, London, England	3955	5975	6195	7120
			7150	9410	9600	9640
			11825	11860	12095	15070
			15400	17815		
0700-0730		Burma Bcasting Service, Rangoon	9730			
0700-0730		Radio Australia, Melbourne	9655	11720	15160	15240
			15395	17715	17750	
0700-0730		Radio Berlin Int'l, East Germany	15240	17880	21540	21645
0700-0730		Radio Bucharest, Romania	21600			
0700-0730		Radio New Zealand, Wellington	12045	15150		
0700-0730	S	Radio Zambia, Lusaka	11880			
0700-0745		Radio Berlin Int'l, East Germany	5965	11810		
0700-0750		Radio Pyongyang, North Korea	15340	17795		
0700-0800		ABC, Perth, Australia	15425			
0700-0800		CBU, Vancouver, British Colombia	6160			
0700-0800		CFCF, Montreal, Quebec	6005			
0700-0800		CFCN, Calgary, Alberta	6030			
0700-0800		CHNS, Halifax, Nova Scotia	6130			
0700-0800		CKWX, Vancouver, British Columbia	6080			
0700-0800		CFRB, Toronto, Ontario	6070			
0700-0800		ELWA, Monrovia, Liberia	11830			
0700-0800		(US) Far East Network, Tokyo	3910			

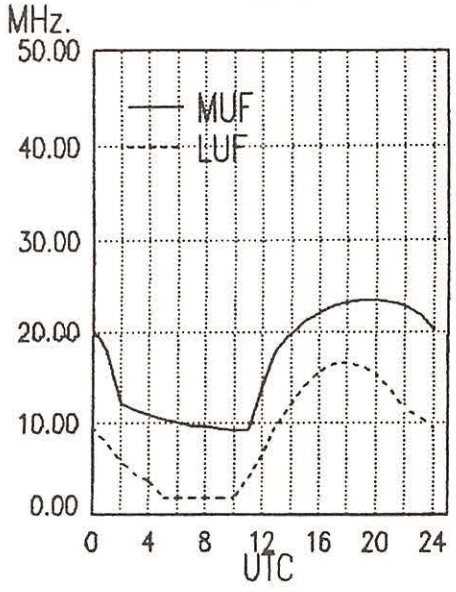
East Coast To
South America



East Coast To
West Coast



East Coast To
Alaska



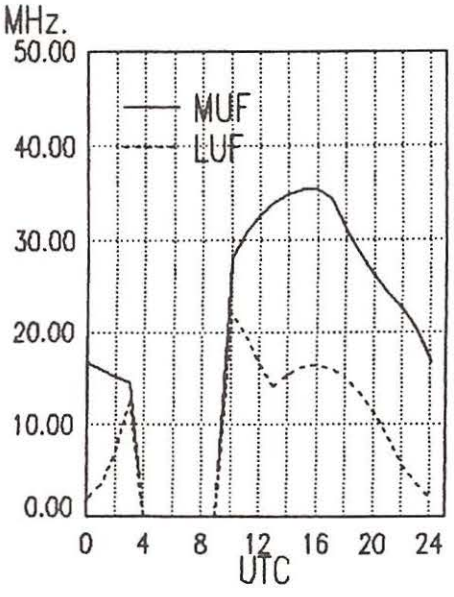
frequency section

0700-0800		HCJB, Quito, Ecuador	6130	6205	9610	9745
			11835	11925		
0700-0800		King of Hope, South Lebanon	6215			
0700-0800		KVOH, Rancho Simi, California	11960			
0700-0800		KYOI, Saipan	17780			
0700-0800		Radio Ghana, Accra	6130			
0700-0800		Radio Havana Cuba	9525			
0700-0800		Radio Japan, Tokyo	5990	15195	15270	15325
			17810	21695		
0700-0800		Radio Jordan, Amman	11955			
0700-0800		Radio Korea, Seoul, South Korea	6060	7275	9570	
0700-0800		Radio Kuwait	15345			
0700-0800		Radio Moscow, USSR	5905	7175	7260	7270
			7310	9765		
0700-0800	A,S	Radio Thailand, Bangkok	9655	11905		
0700-0800		SBC-1, Singapore	11940			
0700-0800		Soloman Islands Broadcasting Corp	9545			
0700-0800	S	Superpower KUSW, Utah	6135			
0700-0800		Trans World Radio, Monte Carlo	7105			
0700-0800		Trans World Radio, Swaziland	6070	9725		
0700-0800		Voice of Free China, Taiwan	5985			
0700-0800	A,S	Voice of Kenya, Nairobi	7270			
0700-0800		Voice of Malaysia, Kuala Lumpur	6175	9750	15295	
0700-0800		Voice of Nigeria, Lagos	15120	15185		
0700-0800		WCSN, Boston, Massachusetts	7365			
0700-0800		WHRI, Noblesville, Indiana	6100	9495		
0700-0800	M-A	WMLK, Bethel, Pennsylvania	9455			
0700-0800		WSHB, Cyprus Creek, S. Carolina	9455			
0700-0800		WYFR, Oakland, California	6065	7355	9680	
0700-0800		WYFR Satellite Network	9852.5			
0715-0730		Radio Korea, Seoul, South Korea	13670	15575		
0715-0730	M-A	Vatican Radio, Vatican City	11725	15190		
0715-0735	S	FEBA, Mahe, Seychelles	15115	17785		
0720-0730	M-A	Vatican Radio, Vatican City	6248	9645	11740	
0730-0800		ABC, Alice Springs, Australia	2310	[ML]		
0730-0800		ABC, Katherine, Australia	2485			
0730-0800		ABC, Tennant Creek, Australia	2325	[ML]		
0730-0800		Radio Australia, Melbourne	5955	9655	11720	15240
0730-0800		Radio Finland, Helsinki	6120	9560	11755	15270
0730-0800		Radio Prague, Czechoslovakia	11685	17840	21705	
0730-0735		All India Radio, New Delhi	5990	6010	6020	7110
			7205	9610	9675	11850
			11935	15235	15250	17705
0730-0745		BBC, London, England*	3975	6010	7230	9915
0730-0800		AWR, Forli, Italy	7125			
0730-0800		BBC, London, England	3955	5975	7150	9410
			9600	9640	11860	12095
			15070	15105	15400	
0730-0800		Radio Netherland, Hilversum	9630	9715		
0730-0800		Radio Prague, Czechoslovakia	11685	17840	21705	
0730-0800		Swiss Radio Int'l, Berne	3985	6165	9535	
0740-0750	W	Radio Free Europe, Munich*	5985	7115	9695	9725
			11895	15355		

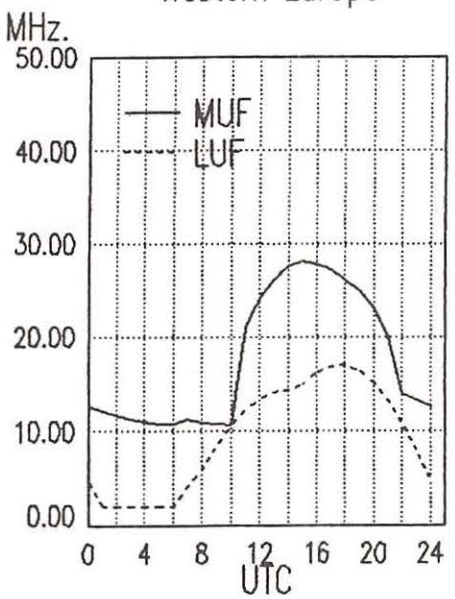
0800 UTC [3:00 AM EST/12:00 AM PST]

0800-0805	M-F	Port Moresby, Papua New Guinea	3925	4890	5960	5985
			6020	6040	6080	6140
			9520			
0800-0805		Soloman Islands Broadcasting Corp	9545			
0800-0815	M-A	Radio Zambia, Lusaka	6165	7235		
0800-0825	M-F	BRT, Brussels, Belgium	11695	21815		
0800-0825		Radio Netherland, Hilversum	9630	9715		
0800-0825		Voice of Malaysia, Kuala Lumpur	6175	9750	15295	
0800-0830		HCJB, Quito, Ecuador	6130	6205	9745	
0800-0830	S	Radio Austria Int'l, Vienna	6155	13730	15410	15450
0800-0830		Radio Bangladesh, Dhaka	12030	15525		
0800-0830		Radio Tirana, Albania	9500	11835		
0800-0830		Voice of Nigeria, Lagos	7255	15185		
0800-0830		Voice of Islam, Pakistan	15525	17870		
0800-0835	S	FEBA, Mahe, Seychelles	15325,	17785		
0800-0835		Trans World Radio, Swaziland	6070	9725		
0800-0840		Trans World Radio, Monte Carlo	7105			
0800-0850		Deutsche Welle, Koln, W. Germany	9770			
0800-0850		Radio Pyongyang, North Korea	9530	11830	15160	15180
0800-0900		ABC, Alice Springs, Australia	2310	[ML]		
0800-0900		ABC, Katherine, Australia	2485			
0800-0900		ABC, Perth, Australia	15425			
0800-0900		ABC, Tennant Creek, Australia	2325	[ML]		
0800-0900		AFAN, Antarctica	6010.5			
0800-0900		BBC, London, England	5975	9410	7150	11845
			11860	11955	12095	15070
			15240			
0800-0900		CBN, St. John's, Newfoundland	6160			
0800-0900		CBU, Vancouver, British Colombia	6160			
0800-0900		CFCF, Montreal, Quebec	6005			
0800-0900		CFCN, Calgary, Alberta	6030			
0800-0900		CHNS, Halifax, Nova Scotia	6130			

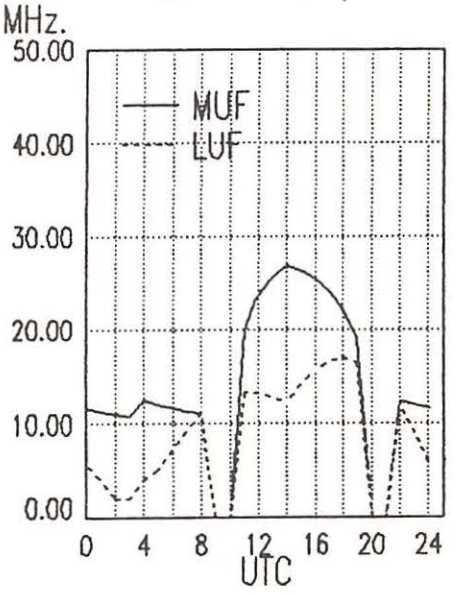
East Coast To
Indian Ocean



Midwest To
Western Europe



Midwest To
Eastern Europe

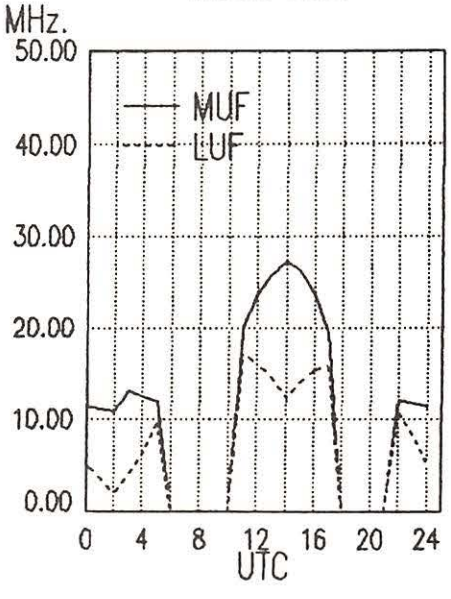


0800-0900		CKWX, Vancouver, British Colombia	6080
0800-0900		CFRB, Toronto, Ontario	6070
0800-0900		(US) Far East Network, Tokyo	3910
0800-0900		King of Hope, South Lebanon	6215
0800-0900		KNLS, Anhor Point, Alaska	6065
0800-0900		KYOI, Saipan	11900
0800-0900		Radio Australia, Melbourne	5995 9580 9655 9710 11720 15285 15395
0800-0900		Radio Jordan, Amman	11955
0800-0900		Radio Moscow, USSR	7310 9760 11705 11745 11900 12010 15135 15155 15475 15230 15460 15520 15540
0800-0900		Radio for Peace, Costa Rica	12030
0800-0900		SBC Radio One, Singapore	5010 5052 11940
0800-0900	S	Superpower KUSW, Utah	6135
0800-0900		Voice of Indonesia, Jakarta	11790 15105
0800-0900	A,S	Voice of Kenya, Nairobi	7270
0800-0900		WHRI, Noblesville, Indiana	7355 9495
0800-0900		WYFR, Oakland, California	9680 11580
0800-0900		WYFR Satellite Network	6065
0805-0900		KTWR, Guam	11805
0815-0845	M-F	Voice of America, Washington DC	7175 9575 9750 11710 11915 15600 17715 21500 [ML]
0815-0900	A,S	Radio Berlin Int'l, East Germany	6040 7185 9730 21465 21540
0830-0840		All India Radio, New Delhi	5960 5990 6010 6020 6050 6065 6100 6140 7110 7140 7160 7250 7280 7295 9610 11850 15235 15250 17705
0830-0855		Radio Austria Int'l, Vienna	6155 13730 15410 15450
0830-0900	S	Bhutan Bcasting Service, Thimpu	6035
0830-0900		FEBC, Manila, Philippines	11850 15350
0830-0900		HCJB, Quito, Ecuador	6130 9745
0830-0900		Radio Beijing, China	9700 11755 15440
0830-0855		Radio Finland, Helsinki	6120 9560 11755
0830-0900		Radio Netherlands, Hilversum	9770
0830-0900		Radio Prague, Czechoslovakia	11685 17840 21705
0830-0900		Swiss Radio Int'l, Berne	9560 9885 13685 17830 21695
0830-0900		Voice of Nigeria, Lagos	7255 15120
0840-0850	M-A	Voice of Greece, Athens	9855 15630
0840-0900	S-F	Trans World Radio, Monte Carlo	7105
0845-0900		Radio Prague, Czechoslovakia	6055 7345 9505
0850-0900		All India Radio, New Delhi	5960 5990 6010 6020 6050 6065 6100 6140 7110 7140 7150 7160 7250 7280 7295 9610 11850 15235 15250 17705

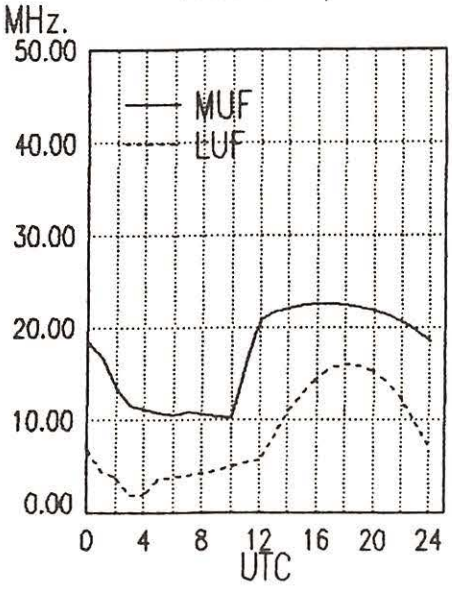
0900 UTC [4:00 AM EST/1:00 AM PST]

0900-0910		All India Radio, New Delhi	5960 5990 6010 6020 6050 6065 6100 6140 7110 7140 7150 7160 7250 7280 7295 9610 11850 15235 15250 17705
0900-0910		Port Moresby, Papua New Guinea	3295 4890 5960 5985 6020 6040 6080 6140 9520
0900-0910	S	Trans World Radio, Monte Carlo	7105
0900-0910		Voice of Lebanon, Beirut	6548
0900-0925	M-A	Radio Finland, Helsinki	17795 21550
0900-0930		FEBC, Manila, Philippines	11850 15350
0900-0930		Nippon Broadcasting Corp.	3925
0900-0930		Radio Beijing, China	9700 11755
0900-0930	A,S	Radio Prague, Czechoslovakia	11685 17840 21705
0900-0950		Deutsche Welle, West Germany	6160 9650 11785 11945 17780 17875 21650
0900-1000		ABC, Alice Springs, Australia	2310 [ML]
0900-1000		ABC, Katherine, Australia	2485
0900-1000		ABC, Tennant Creek, Australia	2325 [ML]
0900-1000	S	Adventist World Radio, Portugal	9670
0900-1000		BBC, London, England	5975 7150 7325 9410 9750 11750 11845 11860 11955 12095 15070 15360
0900-1000		CFCF, Montreal, Quebec	6005
0900-1000		CFCN, Calgary, Alberta	6030
0900-1000		CHNS, Halifax, Nova Scotia	6130
0900-1000		CKWX, Vancouver, British Colombia	6080
0900-1000		CFRB, Toronto, Ontario	6070
0900-1000		(US) Far East Network, Tokyo	3910
0900-1000		HCJB, Quito, Ecuador	6130 9745
0900-1000		King of Hope, South Lebanon	6215
0900-1000		KNLS, Anchor Point, Alaska	6065
0900-1000		KTWR, Agana, Guam	11805
0900-1000		KYOI, Saipan	11900

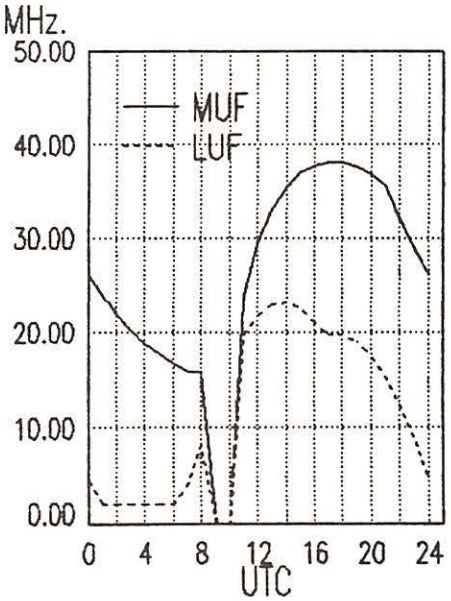
Midwest To
Middle East



Midwest To
Artic Europe



Midwest To
West Africa

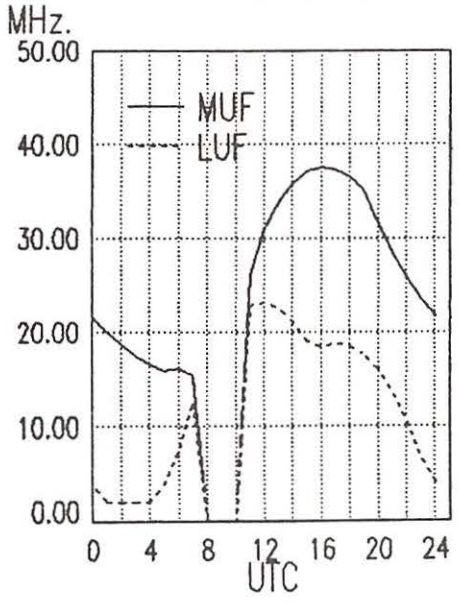


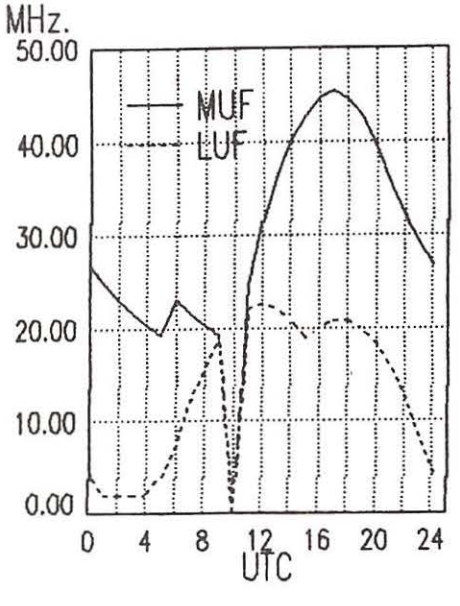
frequency section

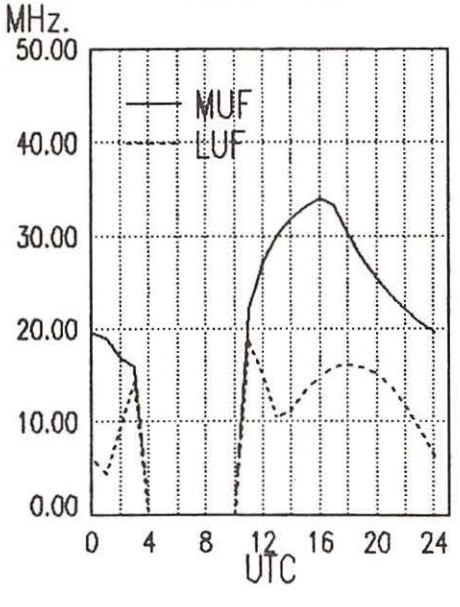
0900-1000		Radio Afghanistan, Kabul	4450	6085	15435	17720
0900-1000		Radio Australia, Melbourne	5995	6080	9580	9655
			9760	11720	15415	
0900-1000		Radio Japan, Tokyo	11840	11885	15270	17810
0900-1000		Radio Korea, Seoul, South Korea	7550	13670		
0900-1000		Radio Moscow, USSR	9735	11705	11900	12010
			15475			
0900-1000		Radio for Peace, Costa Rica	13660			
0900-1000	S	Radio Prague, Czechoslovakia	6055	7345	9505	[ML]
0900-1000		Radio Tanzania, Dar es Salaam	7165			
0900-1000		SBC Radio One, Singapore	5010	5052	11940	
0900-1000	S	Superpower KUSW, Utah	6135			
0900-1000		Voice of America, Washington	6130			
0900-1000		Voice of Kenya, Nairobi	7270			
0900-1000		Voice of Nigeria, Lagos	7255	15120	15185	
0900-1000		WHRI, Noblesville, Indiana	7355	9495		
0900-1000		WYFR, Oakland, California	11580			
0915-0930		Radio Korea, Seoul, South Korea	9570			
0915-0950	M-A	Radio Ulan Bator, Mongolia	9615	12015		
0930-0935		All India Radio, New Delhi	5960	5990	6010	6020
			6050	6065	6100	6140
			7110	7140	7160	7250
			7280	7295	9610	11850
			15235	15250	17705	
0930-0945		BBC, London, England*	9725	11955		
0930-1000		CBN, St. John's, Newfoundland	6160			
0930-1000		Radio Beijing, China	9700	11755	15440	
0930-1000		Radio Finland, Helsinki	11855	15245		
0930-1000		Radio Sweden Int'l, Stockholm	15390			
0945-1000		BBC, London, England*	5995	7180	9725	11955
0945-1000	M-A	Radio Prague, Czechoslovakia	6055	7345	9505	

1000 UTC [5:00 AM EST/2:00 AM PST]

1000-1025		BRT, Brussels, Belgium	17595	21810		
1000-1030		HCJB, Quito, Ecuador	6130	9745	11925	
1000-1030		Radio Afghanistan, Kabul	4450	6085	15435	17720
1000-1030		Radio Beijing, China	9700	11755	15440	
1000-1030	S	Radio Norway Int'l, Oslo	11850	15230	21705	25730
1000-1030		Radio Tanzania, Dar es Salaam	7165			
1000-1030		Swiss Radio Int'l, Berne	9560	9885	13685	17830
			21695			
1000-1030		Voice of Ethiopia, Addis Ababa	9560			
1000-1030		Voice of Vietnam, Hanoi	12010	15010		
1000-1045		Radio Berlin Int'l, East Germany	21465(A,S)	21540		
1000-1055	A	Trans World Radio, Monte Carlo	7105			
1000-1100		ABC, Alice Springs, Australia	2310	[ML]		
1000-1100		ABC, Katherine, Australia	2485			
1000-1100		ABC, Perth, Australia	9610			
1000-1100		ABC, Tennant Creek, Australia	2325	[ML]		
1000-1100		All India Radio, New Delhi	11860	11915	15130	15335
			17387	11785		
1000-1100		BBC, London, England	9410	9750	11750	11845
			12095	15070	15400	17705
			17790	18080	21710	21470
			25750			
1000-1100		CBN, St. John's, Newfoundland	6160			
1000-1100		CFCF, Montreal, Quebec	6005			
1000-1100		CFCN, Calgary, Alberta	6030			
1000-1100		CHNS, Halifax, Nova Scotia	6130			
1000-1100		CKWX, Vancouver, British Colombia	6080			
1000-1100		CFRB, Toronto, Ontario	6070			
1000-1100		(US) Far East Network, Tokyo	3910			
1000-1100		KSDA, Guam	9465			
1000-1100		KTWR, Agana, Guam	11805			
1000-1100		KYOI, Saipan	11900			
1000-1100		Radio Afghanistan, Kabul	15435	17720		
1000-1100		Radio Australia, Melbourne	9580	9770	15415	
1000-1100		Radio Moscow, USSR	9705	9780	9875	11705
			11900	15140	15420	15460
			15595			
1000-1100		Radio New Zealand, Wellington	6100	9850		
1000-1100	S	Radio Prague, Czechoslovakia	6055	7345	9505	[ML]
1000-1100		SBC Radio One, Singapore	5010	5052	11940	
1000-1100	S	Superpower KUSW, Utah	6135			
1000-1100		Voice of America, Washington	6030	5985	6165	9590
1000-1100		Voice of Kenya, Nairobi	7270			
1000-1100		Voice of Nigeria, Lagos	7255	15120		
1000-1100		WHRI, Noblesville, Indiana	7355			
1000-1100		WSHB, Cyprus Creek, S. Carolina	9495			
1000-1100		WYFR, Oakland, California	5950			
1005-1010		Radio Pakistan, Islamabad	15606	17660		
1030-1040		Voice of Asia, Taiwan	5980			
1030-1100		BBC, London, England*	7180	9660	9725	
1030-1100		HCJB, Quito, Ecuador	6130	11925		
1030-1100		Radio Netherlands, Hilversum	6020	9505		
1030-1100	A,S	Radio Tanzania, Dar es Salaam	7165			
1030-1100		SLBC, Colombo, Sri Lanka	11835	15120	17850	[ML]
1030-1100		UAE Radio, United Arab Emirates	15435	17865	21605	



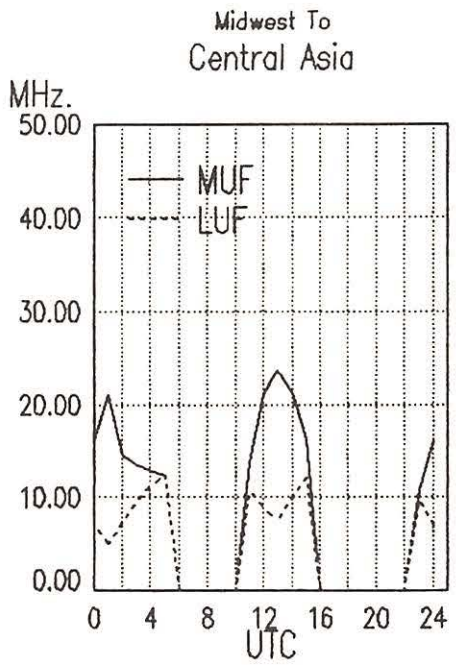


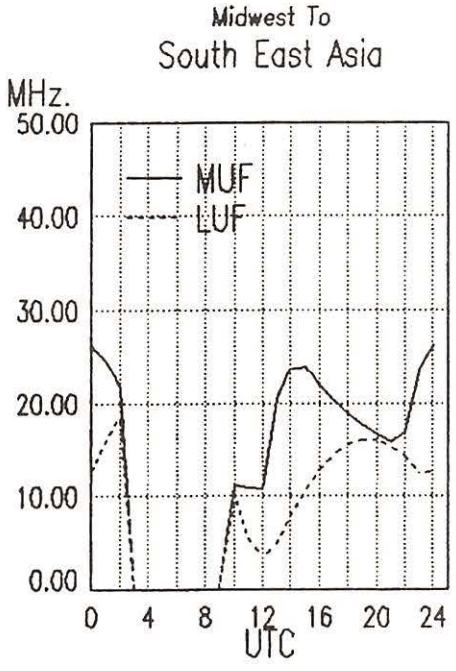


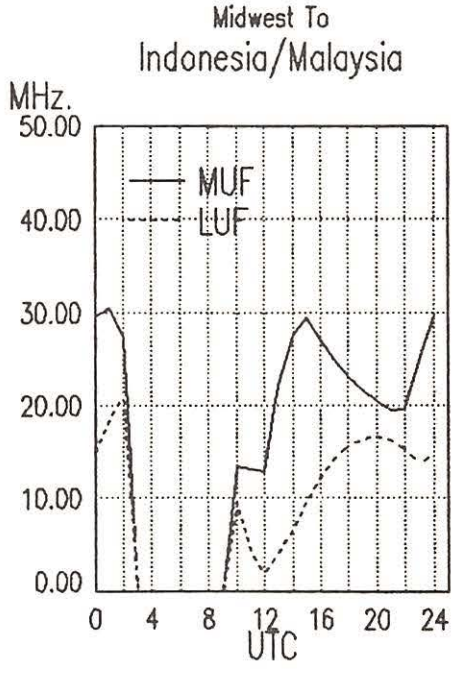
1030-1100		Voice of America, Washington*	11965				
1040-1050	H	Radio Free Europe, Munich*	7115	9695	9725		
			11895	15355			
1040-1050	M-A	Voice of Greece, Athens	11645	15630			
1045-1100	S	Radio Budapest, Hungary	7220	9585	9835	11910	
			15160	15220			
1045-1100	M-A	Radio Prague, Czechoslovakia	6055	7345	9505		
1055-1100	S	Trans World Radio, Monte Carlo	7105				

1100 UTC [6:00 AM EST/3:00 AM PST]

1100-1105		Radio Pakistan, Islamabad	6090	7290			
1100-1105	A	Port Moresby, Papua New Guinea	3295	4890	5960	5985	
			6020	6040	6080	6140	
			9520				
1100-1110	S	Port Moresby, Papua New Guinea	3295	4890	5960	5985	
			6020	6040	6080	6140	
			9520				
1100-1115		Radio New Zealand, Wellington	9850	11780			
1100-1120		Radio Pakistan, Islamabad	15606	17760			
1100-1125		Radio Netherland, Hilversum	6020	9505			
1100-1130		BBC, London, England*	7120				
1100-1130		HCJB, Quito, Ecuador	6130	11925			
1100-1130		Kol Israel, Jerusalem	9385	11700	15485	15640	
			15650	17635	17685	21625	
1100-1130		KTWR, Guam*	9820	11665			
1100-1130	S	Radio Austria Int'l, Vienna	13730	15450			
1100-1130		Radio Mozambique, Maputo	9525	11818	11835		
1100-1130		SLBC, Colombo, Sri Lanka	11835	15120	17850	[ML]	
1100-1130		Swiss Radio Int'l, Berne	11935	13635	15570	17830	
1100-1130		Voice of Vietnam, Hanoi	12010	15010			
1100-1150		Deutsche Welle, West Germany	15410	17765	17800	21600	
1100-1150		Radio Pyongyang, North Korea	9600	9977	11735		
1100-1155		Radio Beijing, China	9665				
1100-1200		ABC, Alice Springs, Australia	2310	[ML]			
1100-1200		ABC, Katherine, Australia	2485				
1100-1200		ABC, Perth, Australia	9610				
1100-1200		ABC, Tennant Creek, Australia	2325	[ML]			
1100-1200		BBC, London, England	5965	6195	7180	9410	
			9515	9740	9750	9760	
			11750	11775	12095	15070	
			17790	18080	21710	21470	
			25750				
1100-1200		CBC Northern Quebec Service	6065	9625			
1100-1200		CBN, St. John's, Newfoundland	6160				
1100-1200		CFCF, Montreal, Quebec	6005				
1100-1200		CFCN, Calgary, Alberta	6030				
1100-1200		CHNS, Halifax, Nova Scotia	6130				
1100-1200		CKWX, Vancouver, British Colombia	6080				
1100-1200		CFRB, Toronto, Ontario	6070				
1100-1200		(US) Far East Network, Tokyo	3910				
1100-1200		KYOI, Saipan	11900				
1100-1200		Radio Australia, Melbourne	5995	7215	9580	9710	
			9770				
1100-1200		Radio Japan, Tokyo	6120				
1100-1200		Radio Moscow, USSR					
			6000	9600	9705	11900	
			13690	15335	15465	15475	
			15490	15500	15530	15540	
			15550	15560	15565	17820	
1100-1200		Radio RSA, South Africa	17755	21590	21800		
1100-1200	A,S	Radio Tanzania, Dar es Salaam	7165				
1100-1200	S	Radio Zambia, Lusaka	11880	[IRR]			
1100-1200		SBC-1, Singapore	5010	5052	11940		
1100-1200	S	Superpower KUSW, Utah	6130				
1100-1200		Voice of America, Washington	5985	6030	6110	6165	
			9590	9760	15160	15425	
1100-1200		Voice of Asia, Taiwan	5980	7445			
1100-1200		Voice of Kenya, Nairobi	7270				
1100-1200		Voice of Nigeria, Lagos	7255	15120			
1100-1200		WHRI, Noblesville, Indiana	7520	11790			
1100-1200		WSHB, Cyprus Creek, S. Carolina	9495				
1100-1200		WYFR, Oakland, California	5950	7355			
1110-1120	M-F	Radio Botswana, Gaborone	4820	5955	7255		
1115-1130		Radio Korea, Seoul, South Korea	11740				
1115-1130		Vatican Radio, Vatican City	17840	21485			
1115-1145		Radio Nepal, Kathmandu	5005				
1115-1200		Trans World Radio, Bonaire	11815	15345			
1130-1145	A	Radio Budapest, Hungary	7220	9585	9835	11910	
			15160	15220			
1130-1200		HCJB, Quito, Ecuador	11740				
1130-1200		Radio Netherland, Hilversum	5955	9715	17575	17605	
			21480	21615			
1130-1200		Radio Thailand, Bangkok	9655	11905			
1130-1200		Radio Tirana, Albania	9480	11855			
1130-1200		Voice of Islamic Republic Iran	7230	9520	9685	11790	
1135-1140		All India Radio, New Delhi	6065	7110	9610	9675	
			11850	15320			
1140-1145	M-A	Vatican Radio, Vatican City	6248	9645	11740		







frequency section

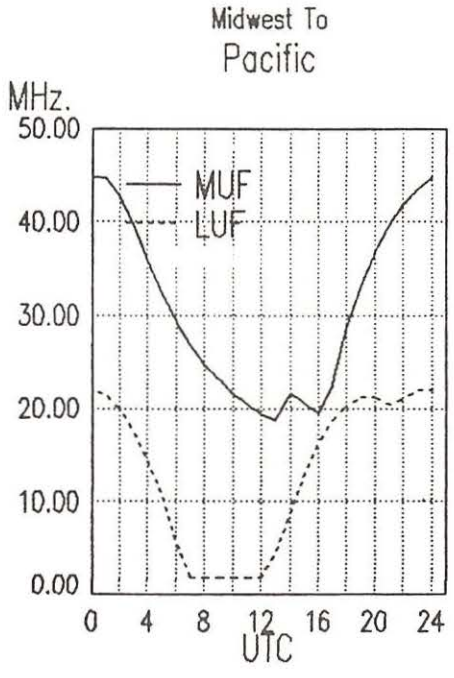
1145-1200		BBC, London, England*	5995	7180	15280	
1145-1200		Radio Bangladesh, Dakha	15255	17740		
1145-1200		Radio Prague, Czechoslovakia	6055	7345	9505	

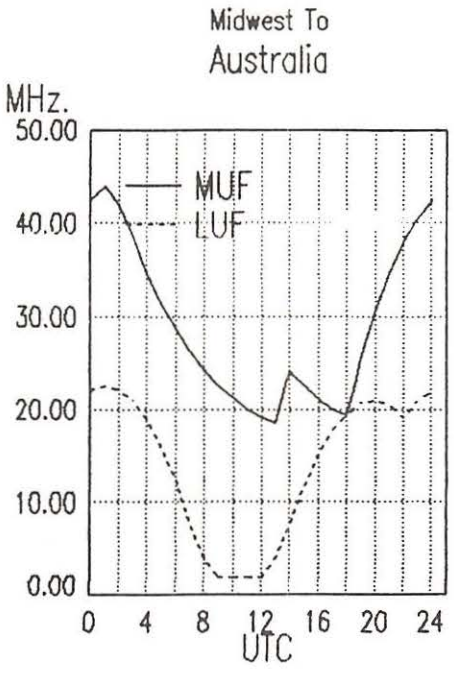
1200 UTC [7:00 AM EST/4:00 AM PST]

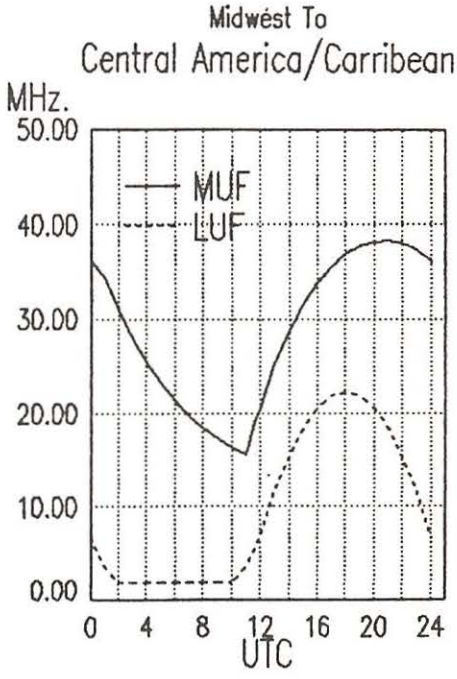
1200-1205	M-A	Port Moresby, Papua New Guinea	3295	4890	5960	6020
			6040	6080	6140	9520
1200-1215		BBC, London, England*	3915	6065	7275	
1200-1215		Vatican Radio, Vatican City	15190	17865		
1200-1215		Voice of Kampuchea, Phnom-Penh	9693	11938		
1200-1220		Radio Bucharest, Romania	17720	21665		
1200-1225		Radio Polonia, Warsaw, Poland	6095	7285		
1200-1230		Radio Finland	11945	15400		
1200-1230		Radio Netherland, Hilversum	5955	9715	17575	17605
			21480	21615		
1200-1230		Radio Somalia, Mogadishu	6095			
1200-1230		Radio Tashkent, Uzbek, USSR	5945	9540	9600	11785
1200-1230		Radio Thailand, Bangkok	9655	11905		
1200-1230	S	Radio Zambia, Lusaka	11880	[IRR]		
1200-1235	M-A	Radio Ulan Bator, Mongolia	9615	12015		
1200-1236		HCJB, Quito, Ecuador	6075			
1200-1255		Radio Beijing, China	9665	11600	15110	17715
1200-1300		ABC, Alice Springs, Australia	2310	[ML]		
1200-1300		ABC, Katherine, Australia	2485			
1200-1300		ABC, Tennant Creek, Australia	2325	[ML]		
1200-1300	S	Adventist World Radio, Africa	17890			
1200-1300		AFAN, Antarctica	6012			
1200-1300		BBC, London, England	5995	6195	9510	9515
			9740	11750	11775	12095
			15070	17705	17790	18080
			21470	21710	25750	
1200-1300		CBC Northern Quebec Service	6065	9625		
1200-1300		CBN, St. John's, Newfoundland	6160			
1200-1300		CFCF, Montreal, Quebec	6005			
1200-1300		CFCN, Calgary, Alberta	6030			
1200-1300		CHNS, Halifax, Nova Scotia	6130			
1200-1300		CKWX, Vancouver, British Colombia	6080			
1200-1300		CFRB, Toronto, Ontario	6070			
1200-1300		(US) Far East Network, Tokyo	3910			
1200-1300		HCJB, Quito, Ecuador	11740	15115	17890	
1200-1300		KYOI, Saipan	11900			
1200-1300		Radio Australia, Melbourne	5995	6060	6080	7205
			7215	9580	9710	9770
			11800			
1200-1300		Radio Moscow, USSR	6000	9705	9875	13710
			15225	15320	15350	15465
			15475	15490	15500	15560
			17645	17700	17810	21800
1200-1300	A,S	Radio Tanzania, Dar es Salaam	7165			
1200-1300		SBC Radio One, Singapore	5010	5052	11940	
1200-1300	S	Superpower KUSW, Utah	6130			
1200-1300		Trans World Radio, Bonaire	11815	15345		
1200-1300		Trans World Radio, Sri Lanka	11920			
1200-1300		Voice of America, Washington	6110	9760	15160	15425
1200-1300		Voice of Kenya, Nairobi	7270			
1200-1300		Voice of Nigeria, Lagos	7255	15120		
1200-1300		WCSN, Boston, Massachusetts	5980			
1200-1300		WHRI, Noblesville, Indiana	7520	11790		
1200-1300		WSHB, Cyprus Creek, S. Carolina	13760			
1200-1300		WYFR, Oakland, California	5950	7355	9680	
1215-1245		Radio Korea, Seoul, South Korea	7275	11740		
1215-1300		Radio Cairo, Egypt	17595			
1230-1235		All India Radio, New Delhi	3905	4800	4920	7280
			9565	9615	11735	15120
1230-1255		Radio Austria Int'l, Vienna	6155	13730	15450	
1230-1300		BBC, London, England*	6125	7255	6195	9635
			9660	11780	12040	15270
			15390	15435	17695	
1230-1300		Radio Bangladesh, Dhaka	15195	17710		
1230-1300		Radio Berlin Int'l, E. Germany	15440	17880	21465	21540
1230-1300		Radio Sweden, Stockholm	9565	17815	21570	
1240-1250	M	Radio Free Europe, Munich*	5985	7115	9695	9725
			11895	15355		
1245-1300		Radio France Int'l, Paris	9805	11670	15365	15155
			17720	21645		
1235-1245		Voice of Greece, Athens	11645	15630	17565	

1300 UTC [8:00 AM EST/5:00 AM PST]

1300-1305		Port Moresby, Papua New Guinea	3295	4890	5960	5980
			6020	6040	6080	6140
			9520			
1300-1310		Radio France Int'l, Paris	9805	11670	15155	17720
			21645			
1300-1315		Radio Berlin Int'l, E. Germany	17880	21465	21540	







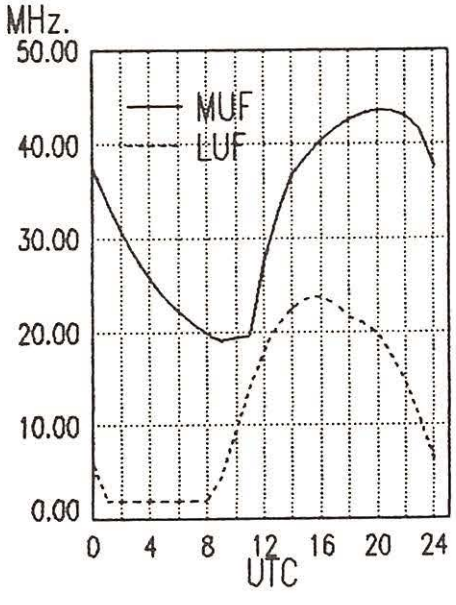
frequency section

1300-1325		Radio Bucharest, Romania	9690	11940	15405	17720	
1300-1325	M-F	Radio Finland, Helsinki	11945	15400			
1300-1330		BBC, London, England	5995	6195	7180	9510	
			9515	9740	11750	11775	
			12095	15070	15420	17790	
			17885	18080	21470	21710	
			25750				
1300-1330	S	Radio Austria Int'l, Vienna	11780	13730	21490		
1300-1330		Radio Cairo, Egypt	17595				
1300-1330		Radio Ghana, Accra	4915	7295			
1300-1330		Radio Moscow, USSR	6050	9705	9815	11840	
			11900	15225	15465	15475	
			15530	15540	15560	17645	
			17810				
1300-1330	S	Radio Norway Int'l, Oslo	6035	9590	15310	21705	
1300-1330		Radio Yugoslavia, Belgrade	11735	15325	15380		
1300-1330		Swiss Radio Int'l, Berne	6165	9535	12030		
1300-1330		Trans World Radio, Sri Lanka	11920				
1300-1330		Voice of Kenya, Nairobi	7270				
1300-1332	A,S	Trans World Radio, Bonaire	11815	15345			
1300-1350		Radio Pyongyang, North Korea	9325	9345	9555	9600	
			11335	11735			
1300-1355		Radio Beijing, China	11600	11660	11755	15280	
			15455				
1300-1400		ABC, Alice Springs, Australia	2310	[ML]			
1300-1400		ABC, Katherine, Australia	2485				
1300-1400		ABC, Tennant Creek, Australia	2325	[ML]			
1300-1400		CBC Northern Quebec Service	6065	9625			
1300-1400		CBN, St. John's, Newfoundland	6160				
1300-1400		CBU, Vancouver, British Colombia	6160				
1300-1400		CFCF, Montreal, Quebec	6005				
1300-1400		CFCN, Calgary, Alberta	6030				
1300-1400		CHNS, Halifax, Nova Scotia	6130				
1300-1400		CKWX, Vancouver, British Colombia	6080				
1300-1400		CFRB, Toronto, Ontario	6070				
1300-1400	S	ELWA, Monrovia, Liberia	11830				
1300-1400		(US) Far East Network, Tokyo	3910				
1300-1400		FEBC, Manila, Philippines	11850				
1300-1400		HCJB, Quito, Ecuador	11740	15115	17890		
1300-1400		KNLS, Anchor Point, Alaska	7355				
1300-1400		KYOI, Saipan	11900				
1300-1400		Radio Australia, Melbourne	5995	6060	6080	7205	
			9580				
1300-1400	M-F	Radio Canada Int'l, Montreal	9625	11720	11955	17820	
1300-1400		Radio Jordan, Amman	9560				
1300-1400		Radio Korea (South), Seoul	9750	15575			
1300-1400		Radio RSA, South Africa	17755	21590			
1300-1400	A,S	Radio Tanzania, Dar es Salaam	7165				
1300-1400		SBC Radio One, Singapore	5010	5052	11940		
1300-1400	S	Superpower KUSW, Utah	6130				
1300-1400		Voice of America, Washington	6110	9760	11715	15160	
			15425				
1300-1400		Voice of Malaysia	7295				
1300-1400		Voice of Nigeria, Lagos	7255	15120			
1300-1400		WCSN, Boston, Massachusetts	5980				
1300-1400		WHRI, Noblesville, Indiana	9455	11790			
1300-1400		WSHB, Cyprus Creek, S. Carolina	13760				
1300-1400		WYFR, Oakland, California	5950	9680	11550	13695	
			15055				
1315-1400		Radio Berlin Int'l, E. Germany	15240				
1330-1345		Radio Korea, Seoul, South Korea	7275	11740			
1330-1355	M-A	BRT, Brussels, Belgium	17565	21815			
1330-1400		BBC, London, England	5995	6195	7180	9410	
			9740	15070	15420	11750	
			17790	17885	18080	21470	
			21710	25750			
1330-1400		All India Radio, New Delhi	9545	10330	11810	15335	
1330-1400	M-A	Bhutan Bcasting Service, Thimpu	6035				
1330-1400		Laotian National Radio	7113				
1330-1400		Radio Moscow, USSR	6050	9705	11840	13680	
			13710				
1330-1400		Radio Tashkent, Uzbek, USSR	5945	9540	9600	11785	
			15455				
1330-1400		Swiss Radio Int'l, Berne	11695	13635	15135	15570	
			17830	21695			
1330-1400		UAE Radio, United Arab Emirates	15435	17865	21605		
1330-1400		Voice of Islamic Republic Iran	9525	9685	9770		
1330-1400		Voice of Kenya, Nairobi	6100				
1330-1400		Voice of Turkey, Ankara	17785				
1330-1400		Voice of Vietnam, Hanoi	12010	15010			
1332-1400	A	Trans World Radio, Bonaire	11815	15345			
1345-1400		Radio Berlin Int'l, E. Germany	15440	17880	21465	21540	

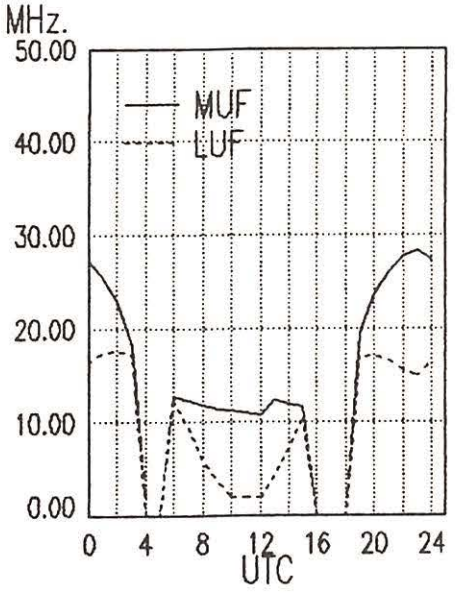
1400 UTC [9:00 AM EST/6:00 AM PST]

1400-1427		Voice of Nigeria, Lagos	15120				
1400-1430		ABC, Alice Springs, Australia	2310	[ML]			
1400-1430		ABC, Tennant Creek, Australia	2325	[ML]			
1400-1430		Radio Berlin Int'l, E. Germany	15440	17880	21465	21540	

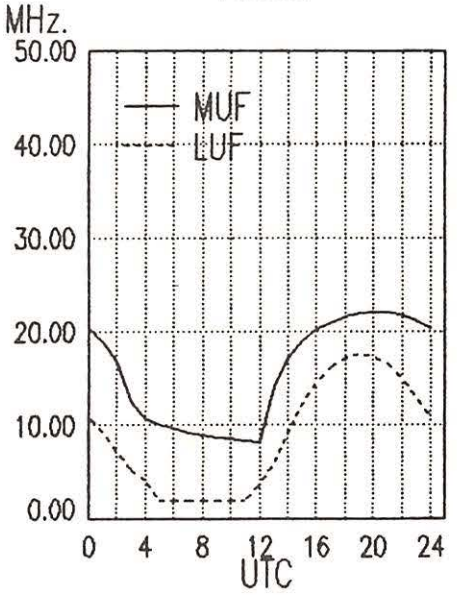
Midwest To
South America



Midwest To
Far East



Midwest To
Alaska



frequency section

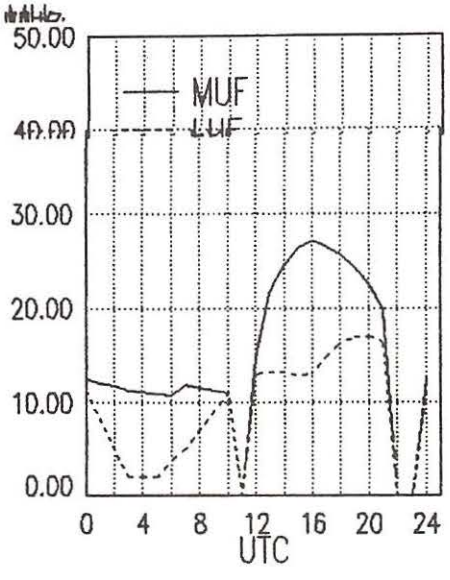
1400-1430		Radio Finland, Helsinki	11945	15400			
1400-1430	S	Radio Norway Int'l, Oslo	15175	15195	21705		
1400-1430		Radio Peace and Progress, USSR	17645	17765			
1400-1430		Radio Polonia, Warsaw, Poland	6095	7285			
1400-1430		Radio Sweden, Stockholm	15345	17815	21615		
1400-1430		Radio Tirana, Albania	9500	11985			
1400-1430		Voice of Ethiopia, Addis Ababa	9550	11710			
1400-1450	T	Radio Free Europe, Munich*	5985	7115	7695	9725	
			11895	15355			
1400-1450		Radio Pyongyang, North Korea	6576	11735			
1400-1455		Radio Beijing, China	7405	11600	15165		
1400-1500		ABC, Katherine, Australia	2485				
1400-1500		ABC, Perth, Australia	9610				
1400-1500		Adventist World Radio, Italy	7275				
1400-1500		All India Radio, New Delhi	9545	11810	15335		
1400-1500		BBC, London, England	5995	6195	7180	9740	
			9750	11750	12095	15070	
			17705	17790	18080	21710	
			21470	25750			
1400-1500		CBN, St. John's, Newfoundland	6160				
1400-1500		CBC Northern Quebec Service	9625	11720			
1400-1500	M-A	CBU, Vancouver, British Colombia	6160				
1400-1500		CFCF, Montreal, Quebec	6005				
1400-1500		CFCN, Calgary, Alberta	6030				
1400-1500		CHNS, Halifax, Nova Scotia	6130				
1400-1500		CKWX, Vancouver, British Colombia	6080				
1400-1500		CFRB, Toronto, Ontario	6070				
1400-1500	S	ELWA, Monrovia, Liberia	11830				
1400-1500		(US) Far East Network, Tokyo	3910				
1400-1500		FEBC, Manila, Philippines	9670	11850			
1400-1500		HCJB, Quito, Ecuador	11740	15115	17890		
1400-1500		KYOI, Saipan	11900				
1400-1500		Radio Australia, Melbourne	5995	6035	6060	6080	
			7205	9580			
1400-1500	S	Radio Canada Int'l, Montreal	9625	11720	11955	17820	
1400-1500		Radio Japan, Tokyo	7140	9695	11815		
1400-1500		Radio Korea, Seoul	9570	9750	15575		
1400-1500		Radio Moscow, USSR	5905	5920	5980	6020	
			9875	13680	13710	17810	
			21630				
1400-1500		Radio RSA, South Africa	11925	21535	21590	25790	
1400-1500	A,S	Radio Tanzania, Dar es Salaam	7165				
1400-1500		SBC Radio One, Singapore	5010	5052	11940		
1400-1500	S	Superpower KUSW, Utah	9850				

1400-1500		Voice of America, Washington	6110	9645	9700	9760	
			11920	15160	15205		
1400-1500		Voice of Kenya, Nairobi	6100				
1400-1500		Voice of Malaysia, Kuala Lumpur	4950				
1400-1500		Voice of Mediterranean, Malta	11925				
1400-1500		Voice of Nigeria, Lagos	7255				
1400-1500		WCSN, Boston, Massachusetts	13760				
1400-1500		WHRI, Noblesville, Indiana	9455	11790			
1400-1500		WSHB, Cyprus Creek, S. Carolina	17640				
1400-1500		WYFR, Oakland, California	5950	9600	11830	17612.5	
1400-1500		WYFR Satellite Net, California	13695	15375			
1415-1420		Radio Nepal, Kathmandu	3230	5005			
1430-1500	F	ABC, Alice Springs, Australia	2310	[ML]			
1430-1500	F	ABC, Tennant Creek, Australia	2325	[ML]			
1430-1500		Burma Broadcasting Service	5985				
1430-1500		King of Hope, Southern Lebanon	6280				
1430-1500		KTWR, Agana, Guam	9780				
1430-1500		Radio Australia, Melbourne	6060	9580			
1430-1500	A,S	Radio Finland, Helsinki	11945	15400			
1430-1500		Radio France International, Paris	6175	9805	11670	13715	
			15155				
1430-1500		Radio Netherland, Hilversum	13770	15150	17575	17605	
			21615				
1430-1500		Radio Prague, Czechoslovakia	9605	11685	13715	15110	
			17705	21505			
1445-1500	M-A	Radio Ulan Bator, Mongolia	9575	15305			

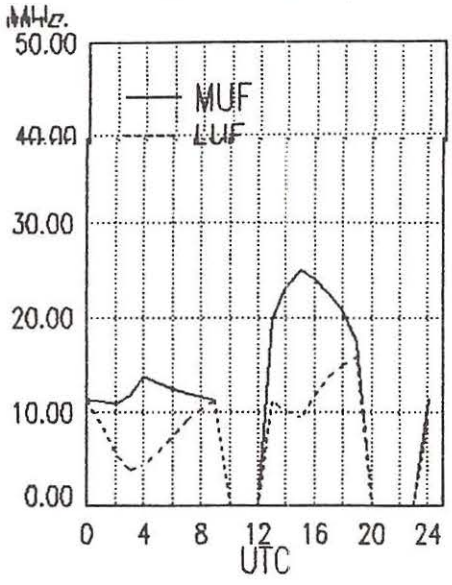
1500 UTC [10:00 AM EST/7:00 AM PST]

1500-1505		Africa No. 1, Gabon	7200	15200			
1500-1510		Vatican Radio, Vatican City	11960	15090	17870		
1500-1515		BBC, London, England	5995	6195	7180	9410	
			9515	9740	11750	12095	
			15070	15260	15400	17705	
			17885	18080	21470	21710	
			25750				
1500-1515		FEBA, Mahe, Seychelles	15325				
1500-1520		Radio Ulan Bator, Mongolia	9575	15305			
1500-1525		Radio Bucharest, Romania	9510	9690	11775	11940	
			15250	15335			
1500-1525		Radio Netherland, Hilversum	13770	15150	17575	17605	
			21615				
1500-1530		Radio Finland, Helsinki	9560	11715	11850	15185	
1500-1530	A,S	Radio Tanzania, Dar es Salaam	7165				

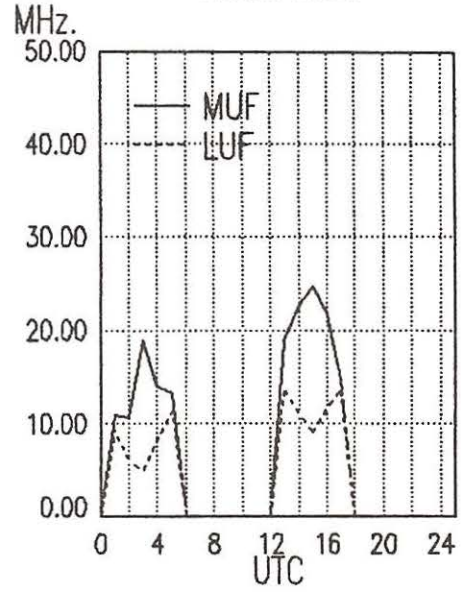
West Coast To
Western Europe



West Coast To
Eastern Europe



West Coast To
Middle East

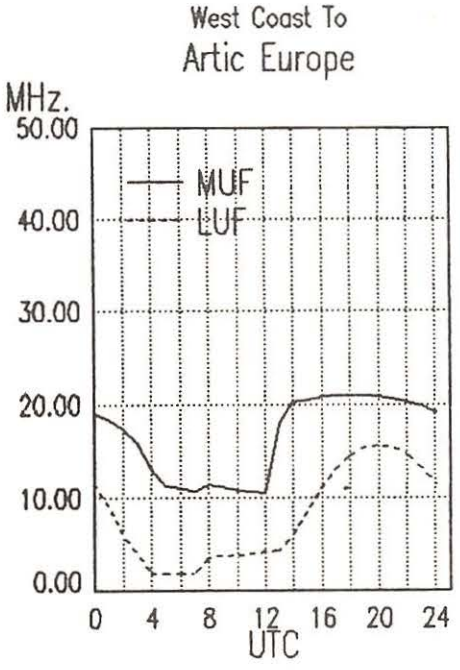


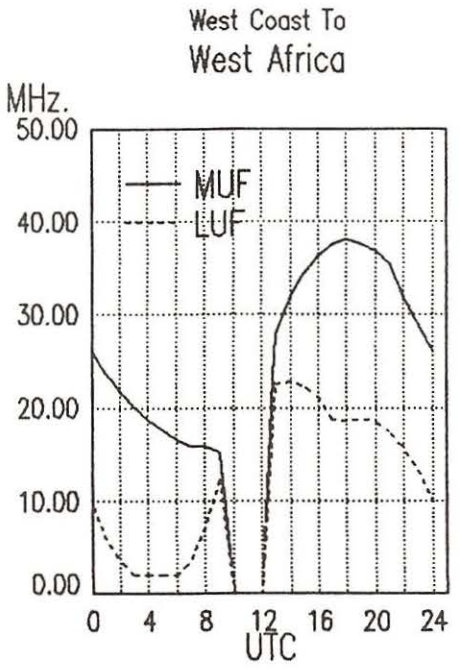
frequency section

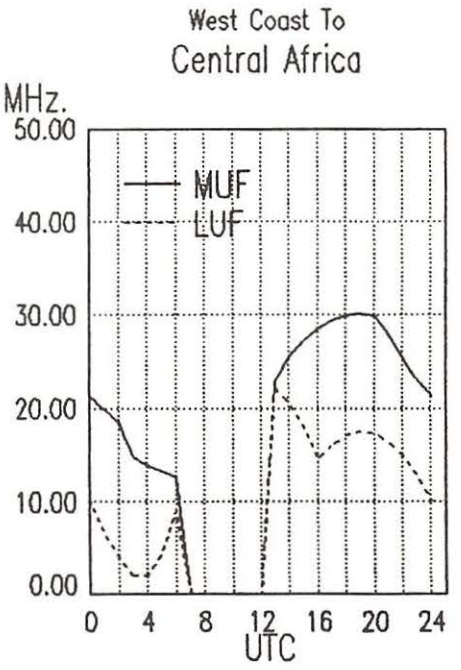
1500-1530		Radio Veritas Asia, Philippines	9770	15215			
1500-1550		Deutsche Welle, West Germany	9735	11965	17810	21600	
1500-1550		Radio Pyongyang, North Korea	6576	9325	9345	9640	
			9977				
1500-1555		Radio Beijing, China	11600	15165			
1500-1600	F	ABC, Alice Springs, Australia	2310 [ML]				
1500-1600		ABC, Perth, Australia	9610				
1500-1600	F	ABC, Tennant Creek, Australia	2325 [ML]				
1500-1600		AWR, Alajuela, Costa Rica	15460				
1500-1600		Burma Broadcasting Service	5985				
1500-1600		CBC Northern Quebec Service	9625	11720			
1500-1600		CBN, St. John's, Newfoundland	6160				
1500-1600		CBU, Vancouver, British Colombia	6160				
1500-1600		CFCF, Montreal, Quebec	6005				
1500-1600		CFCN, Calgary, Alberta	6030				
1500-1600		CHNS, Halifax, Nova Scotia	6130				
1500-1600		CKWX, Vancouver, British Colombia	6080				
1500-1600		CFRB, Toronto, Ontario	6070				
1500-1600	S	ELWA, Monrovia, Liberia	11830				
1500-1600		(US) Far East Network, Tokyo	3910				
1500-1600		FEBC, Manila, Philippines	11850				
1500-1600		HCJB, Quito, Ecuador	11740	11810	15115	17890	
1500-1600		King of Hope, Southern Lebanon	6280				
1500-1600		KNLS, Anchor Point, Alaska	7355				
1500-1600		KTWR, Agana, Guam	11650				
1500-1600		KYOI, Saipan	11900				
1500-1600		Radio Australia, Melbourne	5995	6035	6060	6080	
			7205	7215	9580		
1500-1600	S	Radio Canada Int'l, Montreal	9625	11720	11955	17820	
1500-1600		Radio Japan, Tokyo	9505	9695	11815	21700	
1500-1600		Radio Jordan, Amman	9560				
1500-1600		Radio Korea (South), Seoul	9870				
1500-1600		Radio Moscow, USSR	5980	11730	11840	11900	
			15475	15540	15560	17665	
			17810	17820			
1500-1600		Radio RSA, South Africa	11925	21535	21590	25790	
1500-1600		SBC Radio One, Singapore	5010	5052	11940		
1500-1600		SLBC, Sri Lanka	9720				
1500-1600	S	Superpower KUSW, Utah	9850				
1500-1600		Voice of America, Washington	6110	9575	9645	9700	
			9760	15205			
1500-1600		Voice of Ethiopia, Addis Ababa	7165	9560			
1500-1600		Voice of Indonesia, Jakarta	11790	15150			
1500-1600		Voice of Kenya, Nairobi	6100				
1500-1600		Voice of Malaysia, Kuala Lumpur	4950				
1500-1600		Voice of Mediterranean, Malta	11925				
1500-1600		Voice of Nigeria, Lagos	7255	11770			
1500-1600		WCSN, Boston, Massachusetts	13760				
1500-1600		WHRI, Noblesville, Indiana	15105	21840			
1500-1600	S	WRNO, New Orleans, Louisiana	11965				
1500-1600		WSHB, Cyprus Creek, S. Carolina	17640				
1500-1600		WYFR, Oakland, California	5950	9600	17612.5		
1500-1600		WYFR Satellite Net	11830	13695	15375		
1515-1600		BBC, London, England	5995	6195	7180	9410	
			9515	9740	11750	12095	
			15070	15260	15400	17885	
			18080	21470	21710		
1515-1600		FEBA, Mahe, Seychelles	11865	15325			
1530-1545		All India Radio, New Delhi	3905	3925	4860	6160	
			7160	7412	9545	9950	
1530-1600		Radio Prague, Czechoslovakia	6055	7395	9605	11685	
			11990	13715	15110	15155	
			17705	21505			
1530-1600		Radio Sofia, Bulgaria	7245	9740	11735		
1530-1600		Radio Sweden, Stockholm	15240	15330	17810		
1530-1600		Radio Tanzania, Dar es Salaam	9684				
1530-1600		Radio Tirana, Albania	9480	11835			
1530-1600		Radio-Television Morocco, Rabat	17595				
1530-1600		Swiss Radio Int'l, Berne	13685	15430	17830	21630	
1530-1600		Voice of Asia, Taiwan	5980	7445			
1530-1600		Voice of Nigeria, Lagos	15120				
1540-1550	M-A	Voice of Greece, Athens	9855	11645	15630		
1545-1600		Radio Berlin Int'l, East Germany	15240	17880			
1545-1600		Radio Canada Int'l, Montreal	9555	11915	11935	15315	
			15325	17820			
1545-1600		Vatican Radio, Vatican City	11810	15120	17730		
1545-1600		Voice of Vietnam, Hanoi	10011	11750			
1550-1600	H-S	KTWR, Agana, Guam	9780				

1600 UTC [11:00 AM EST/8:00 AM PST]

1600-1610		FEBA, Mahe, Seychelles	11865	15325			
1600-1610		Radio Lesotho, Maseru	4800				
1600-1610		SBC Radio One, Singapore	5010	5052	11940		
1600-1625		Radio Prague, Czechoslovakia	6055	9605	11665	11685	
			11990	13715	15110	15155	
			15165	17730	21505		
1600-1630		ELWA, Monrovia, Liberia	11830				
1600-1630		HCJB, Quito, Ecuador	17890				





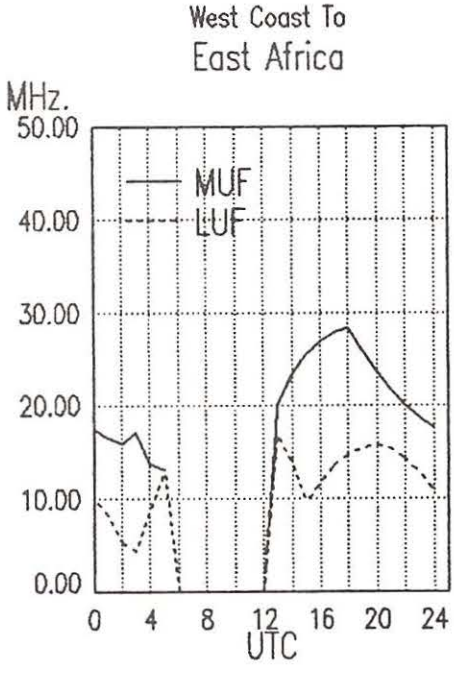


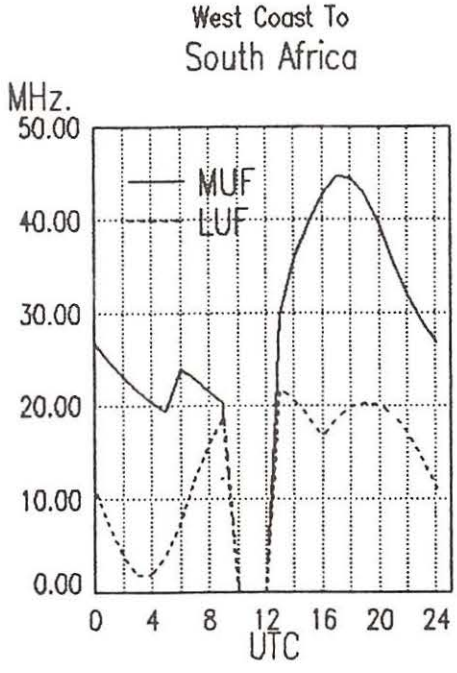
frequency section

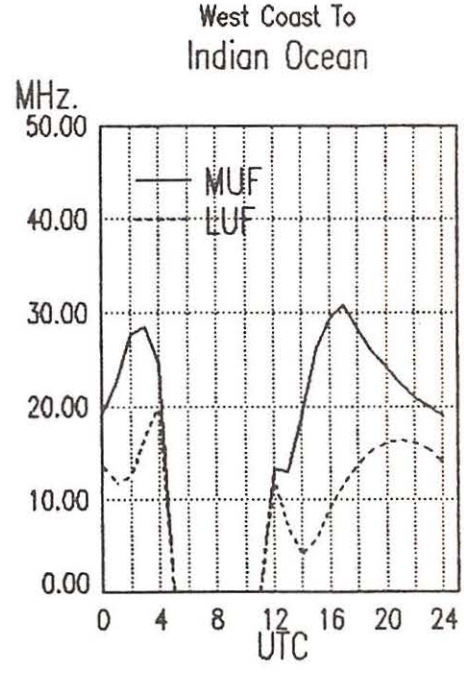
1600-1630		KTWR, Agana, Guam	11905
1600-1630		Radio Berlin Int'l, E. Germany	15240 17880
1600-1630	S	Radio Norway Int'l, Oslo	9610 15265 15310 21705
1600-1630		Radio Pakistan, Islamabad	7365 9465 9785 11615 11625 15125
1600-1630		Radio Polonia, Warsaw, Poland	6135 9540
1600-1630	M-F	Radio Portugal, Lisbon	15245
1600-1630		Radio Sofia Bulgaria	7245 9560 11735 15310
1600-1630		SLBC, Colombo, Sri Lanka	6075 9720
1600-1630		Trans World Radio, Swaziland	5055 9525
1600-1630		Voice of Asia, Taiwan	5980 7445
1600-1630		Voice of Vietnam, Hanoi	9840 12020
1600-1645		Radio Nacional Angola, Luanda	7245 9535 11955
1600-1645		UAE Radio, United Arab Emirates	11730 15435 17865
1600-1650		Deutche Welle, West Germany	6170 7200 9745 15105 15595 17825 21680
1600-1655		Radio Beijing, China	9570 11600 11715
1600-1700	F	ABC, Alice Springs, Australia	2310 [ML]
1600-1700		ABC, Perth, Australia	9610
1600-1700	F	ABC, Tennant Creek, Australia	2325 [ML]
1600-1700		AWR, Alajuela, Costa Rica	15460
1600-1700		BBC, London, England	5975 5995 6195 7180 9740 9410 9515 11750 12095 15070 15260 15400 17705 17885 18080 21470
1600-1700		CBC Northern Quebec Service	9625 11720
1600-1700		CBN, St. John's, Newfoundland	6160
1600-1700		CBU, Vancouver, British Colombia	6160
1600-1700		CFCF, Montreal, Quebec	6005
1600-1700		CFCN, Calgary, Alberta	6030
1600-1700		CHNS, Halifax, Nova Scotia	6130
1600-1700		CKWX, Vancouver, British Colombia	6080
1600-1700		CFRB, Toronto, Ontario	6070
1600-1700		(US) Far East Network, Tokyo	3910
1600-1700		KNLS, anchor Point, Alaska	7355
1600-1700		KSDA, Guam	11980
1600-1700		Radio Australia, Melbourne	5995 6035 6060 6080 7205 7215 9580
1600-1700		Radio Beijing, China	15130
1600-1700	S	Radio Canada Int'l, Montreal	11955 17820
1600-1700		Radio France Int'l, Paris	11705 15360 17620 17795
1600-1700		Radio Jordan, Amman	9560
1600-1700		Radio Korea, Seoul, South Korea	5985 9870
1600-1700		Radio Malawi, Blantyre	3380 5995
1600-1700		Radio Moscow, USSR	7160 7265 7345 9705 9825 9875 11730 11840 12010 15475 15550
1600-1700		Radio Riyadh, Saudi Arabia	9705 9720
1600-1700		Radio Tanzania, Dar es Salaam	9684
1600-1700		Superpower KUSW, Utah	15650
1600-1700		Voice of America, Washington, DC	9575 9645 9760 15205 15410 15445 15580 15600 17785 17800 17870
1600-1700		WCSN, Boston, MA	21640
1600-1700		WHRI, Noblesville, Indiana	15105 21840
1600-1700		WRNO, New Orleans, Louisiana	15420
1600-1700		WYFR, Oakland, California	9600 15440 17612.5
1600-1700		WYFR Satellite Network	11830 13695 21525 21615
1600-1700		Radio Zambia, Lusaka	9580
1615-1630	M,H	Radio Budapest, Hungary	7220 9585 9835 11910 15160 15220
1615-1630		Voice of Vietnam, Hanoi	11750
1615-1700		Radio Berlin Int'l, East Germany	6115 7295 9730 15255 17775
1630-1655	M-A	BRT, Brussels, Belgium	17585 21810
1630-1700		Radio Netherlands, Hilversum	6020 15560
1630-1700		RTM Morocco	17595 17815
1645-1700		Radio Korea (South), Seoul	5975 7275 9870

1700 UTC [12:00 PM EST/9:00 AM PST]

1700-1705		Radio Uganda, Kampala	4976 5026
1700-1715	M-A	Voice of Namibia (Angola)	11955
1700-1725		Radio Budapest, Hungary	6110 9585 9835 11910 15160
1700-1725		Radio Netherland, Hilversum	6020 15560
1700-1730		Radio Australia, Melbourne	5995 6060 6080 7205 9580
1700-1730		Radio Japan, Tokyo	9505 11705 11815
1700-1730	S	Radio Norway Int'l, Oslo	9655 15220 15310 21700
1700-1730		SLBC, Colmbo, Sri Lanka	11800
1700-1745		BBC, London, England	9410 9515 9740 11750 11775 12095 15070 15260 15400 17885 21470
1700-1750		Radio Pyongyang, North Korea	7290 9345 9640 9977
1700-1755		Radio Beijing, China	9570 9750 11600
1700-1800	F	ABC, Alice Springs, Australia	2310 [ML]





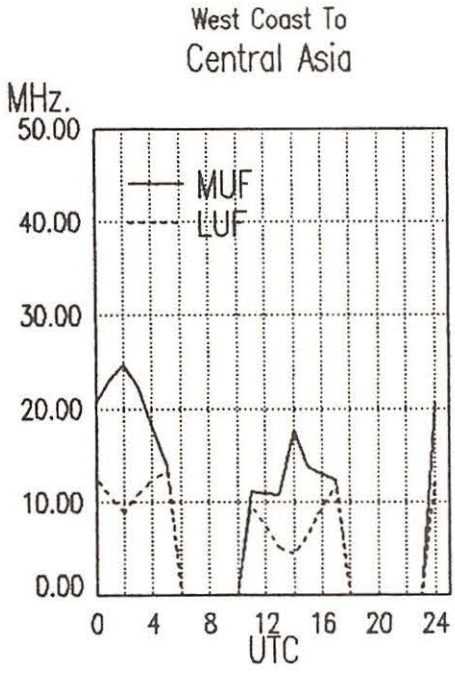


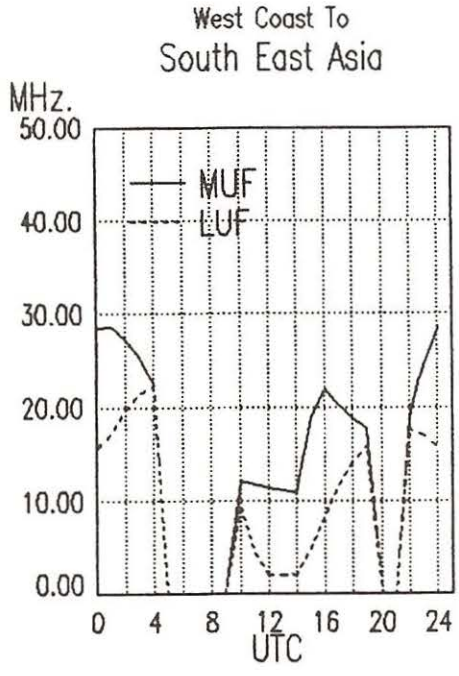
frequency section

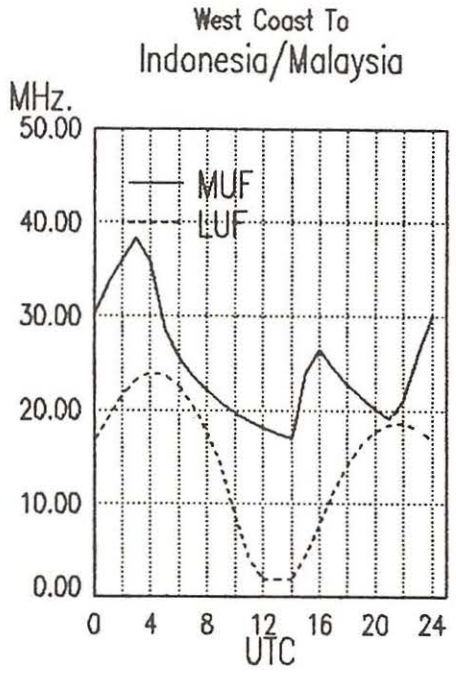
1700-1800		ABC, Tennant Creek, Australia	2325	[ML]		
1700-1800		AWR Africa, Gabon	9625			
1700-1800		CBC Northern Quebec Service	9625	11720		
1700-1800		CBN, St. John's, Newfoundland	6160			
1700-1800		CBU, Vancouver, British Colombia	6160			
1700-1800		CFCF, Montreal, Quebec	6005			
1700-1800		CFCN, Calgary, Alberta	6030			
1700-1800		CHNS, Halifax, Nova Scotia	6130			
1700-1800		CKWX, Vancouver, British Colombia	6080			
1700-1800		CFRB, Toronto, Ontario	6070			
1700-1800		(US) Far East Network, Tokyo	3910			
1700-1800		Radio Havana Cuba	11920			
1700-1800		Radio Jordan, Amman	9560			
1700-1800		Radio Korea, Seoul, South Korea	5975	9870	15575	
1700-1800	M-F	Radio Malabo, Equatorial Guinea	9553	[ML]		
1700-1800		Radio Moscow, USSR	5920	6095	7260	7265
			7345	9705	9825	9875
			11840	12015	15460	15550
1700-1800		Radio Riyadh, Saudi Arabia	9705	9720		
1700-1800		Radio Tanzania, Dar es Salaam	9684			
1700-1800		Radio Zambia, Lusaka	9580			
1700-1800		RTM Morocco	17815			
1700-1800		SBC Radio One, Singapore	5052	11940		
1700-1800		Superpower KUSW, Utah	15650			
1700-1800	A,S	Swaziland Commercial Radio	6155			
1700-1800		Voice of Africa, Egypt	15255			
1700-1800		Voice of America, Washington	6110	9575	9645	9760
			11760	11920	15205	15410
			15445	15580	15600	17785
			17800	17870		
1700-1800		Voice of Kenya, Nairobi	6100			
1700-1800		Voice of Nigeria, Lagos	11770			
1700-1800		WCSN, Boston, Massachusetts	21640			
1700-1800		WHRI, Noblesville, Indiana	13760	15105		
1700-1800		WINB, Red Lion, Pennsylvania	15295			
1700-1800	S-F	WMLK, Bethel, Pennsylvania	9465			
1700-1800		WRNO, Louisiana	15420			
1700-1800		WYFR Satellite Net	11830	13695		
1700-1800		WYFR, Okeechobee, Florida	11855	15375	17750	
1715-1730		Radio Canada Int'l, Montreal	5995	7235	15325	17820
1715-1745		BBC, London, England*	3975	6185	7165	
1718-1800		Radio Pakistan, Islamabad	6210	7835		
1725-1740		Radio Suriname Int'l, Paramibo	7835v			
1725-1800		Radio New Zealand, Wellington	11780	15150		
1730-1735		All India Radio, New Delhi	4840	4860	4920	6160
			7412	9950		
1730-1755		Radio Austria Int'l, Vienna	5945	6155	12010	13730
1730-1755		Radio Bucharest, Romania	7105	9530	9685	11790
			11940	15270	15340	
1730-1800		Radio Australia, Melbourne	5995	6035	6060	6080
			7205	9580		
1730-1800		Radio Polonia, Warsaw, Poland	6135	9540		
1730-1800		Radio Prague, Czechoslovakia	9605	11685	11990	13715
			15110	21505		
1730-1800		RAE, Buenos Aires, Argentina	15345			
1734-1800		FEBA, Mahe, Seychelles	11810			
1745-1800		BBC, London, England	9410	9740	11750	12095
			15070	15400	17885	21470

1800 UTC [1:00 PM EST/10:00 AM PST]

1800-1805	A	SBC Radio One, Singapore	11940			
1800-1815		Kol Israel, Jerusalem	9385	11585	13750	LSB
1800-1815		Radio Cameroon, Yaounde	3970	4750	4795	4850
			5010			
1800-1815		SLBC, Colombo, Sri Lanka	11800			
1800-1825	A,S	FEBA, Mahe, Seychelles	11760			
1800-1825		Radio Prague, Czechoslovakia	5930	7345	9605	11685
			11990	13715	15110	21505
1800-1825		RAE, Buenos Aires, Argentina	15345			
1800-1830		BBC, London, England	7325	9410	11750	12095
			15070	15400	15420	17885
1800-1830	S	Radio Bamako, Mali	4835	5995		
1800-1830	M-F	Radio Canada Int'l, Montreal	15260	17820		
1800-1830		Radio Mozambique, Maputo	3265	4855	9618	
1800-1830		Radio Sweden, Stockholm	6065	11845		
1800-1830		Voice of Africa, Egypt	15255			
1800-1830		Voice of Vietnam, Hanoi	9840	12020		
1800-1845		Radio Abidjan, Ivory Coast	11920			
1800-1845		Trans World Radio, Swaziland	9525			
1800-1850		Radio Bras, Brasilia, Brazil	15265			
1800-1856		Radio RSA, South Africa	15365	17795		
1800-1900	F	ABC, Alice Springs, Australia	2310	[ML]		
1800-1900	F	ABC, Tennant Creek, Australia	2325	[ML]		
1800-1900		All India Radio, New Delhi	11935	15360		
1800-1900		CBC Northern Quebec Service	9625	11720		
1800-1900		CBN, St. John's, Newfoundland	6160			
1800-1900		CBU, Vancouver, British Colombia	6160			





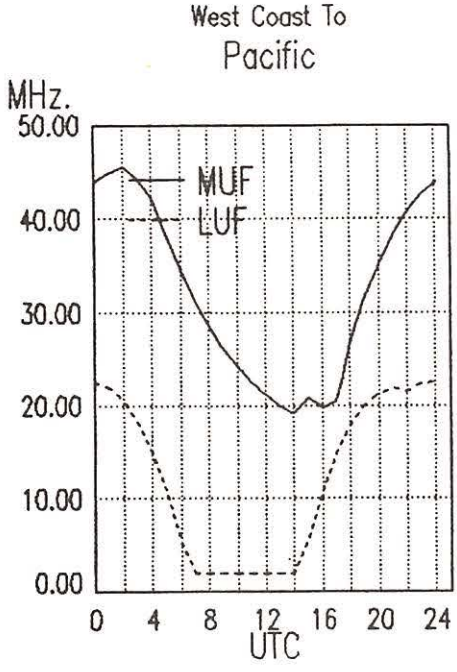


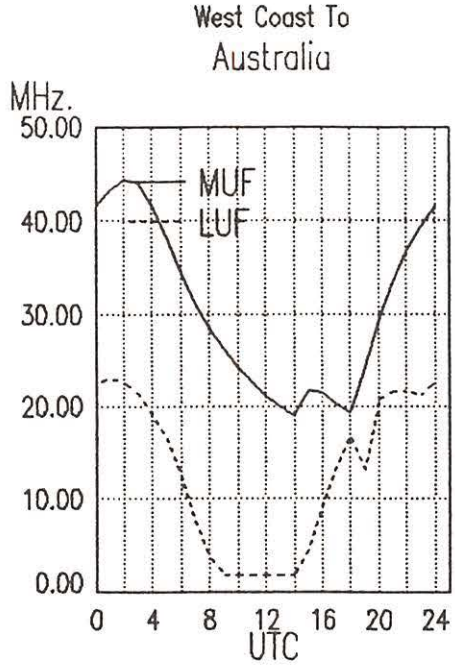
frequency section

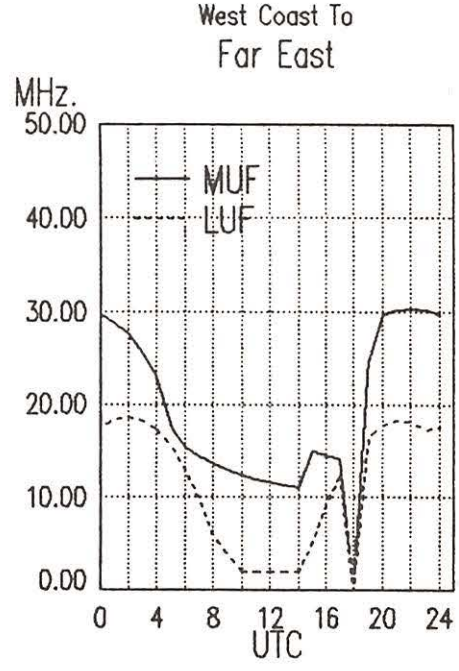
1800-1900		CFCF, Montreal, Quebec	6005			
1800-1900		CFCN, Calgary, Alberta	6030			
1800-1900		CHNS, Halifax, Nova Scotia	6130			
1800-1900		CKWX, Vancouver, British Colombia	6080			
1800-1900		CFRB, Toronto, Ontario	6070			
1800-1900		(US) Far East Network, Tokyo	3910			
1800-1900		KNLS, Anchor Point, Alaska	7355			
1800-1900		KYOI, Saipan	9455			
1800-1900		Radio Australia, Melbourne	5995	6035	6060	6080
			7205	7215	9580	
1800-1900	A,S	Radio Canada Int'l. Montreal	15260	17820		
1800-1900		Radio Jamahiriya, Libya	15450			
1800-1900		Radio Jordan, Amman	9560			
1800-1900		Radio Kuwait, Kuwait	11665			
1800-1900		Radio Malabo, Equatorial Guinea	9553v	[ML]		
1800-1900		Radio Moscow, USSR	7150	7265	9540	9825
			9875	11840	12010	15460
			15480			
1800-1900		Radio New Zealand, Wellington	11780	15150		
1800-1900		Radio Riyadh, Saudi Arabia	9705	9720		
1800-1900		Radio Tanzania, Dar es Salaam	9684			
1800-1900		Radio Zambia, Lusaka	9580			
1800-1900		Superpower KUSW, Utah	15650			
1800-1900	A,S	Swaziland Commercial Radio	6155			
1800-1900		Voice of America, Washington	9575	9760	11760	11920
			15205	15410	15445	15580
			15600	17785	17800	17870
			21485			
1800-1900		Voice of Ethiopia	9662			
1800-1900		Voice of Kenya, Nairobi	6100			
1800-1900		Voice of Nigeria, Lagos	11770	15120		
1800-1900		WCSN, Boston, Massachusetts	21640			
1800-1900		WHRI, Noblesville, Indiana	13760	17830		
1800-1900		WINB, Red Lion, Pennsylvania	15295			
1800-1900	S-F	WMLK, Bethel, Pennsylvania	9465			
1800-1900		WRNO, New Orleans, Louisiana	15420			
1800-1900		WYFR, Oakland, California	11580	11855	15375	
1800-1900		WYFR Satellite Net, California	11830	13695		
1815-1900		Radio Bangladesh, Dhaka	6240	7505	11510	15510
1830-1855		Radio Austria Int'l, Vienna	5945	6155	12010	13730
1800-1855		Radio Polonia, Warsaw, Poland	5995	6135	7125	7285
			9525	11840		
1815-1830		Radio Korea, Seoul, South Korea	9870	15575		
1830-1855		BRT Brussels, Belgium	5915	11695		
1830-1900		BBC, London, England	7325	9410	9740	11750
			12095	15070	15400	17885
1830-1900		Radio Berlin Int'l, E. Germany	9665	13610	15145	15255

1900 UTC [2:00 PM EST/11:00 AM PST]

1900-1903		Africa No. 1, Gabon	15475			
1900-1905	M-A	Vatican Radio, Vatican City	6190	6248	7250	9645
1900-1915		Radio Bangladesh, Dhaka	6240	7505	11510	
1900-1915		Radio Berlin Int'l, E. Germany	9665	13610	15145	15255
1900-1915		Radio Tanzania, Dar es Salaam	9684			
1900-1925		Radio Netherland, Hilversum	6020	15175	17605	21685
1900-1925		Voice of Islamic Republic Iran	9695			
1900-1930	F	ABC, Alice Springs, Australia	2310	[ML]		
1900-1930	F	ABC, Tennant Creek, Australia	2325	[ML]		
1900-1930		Radio Afghanistan, Kabul	7160	7310	9640	
1900-1930		Radio Japan, Tokyo	9505	11705		
1900-1930		Radio Kiev, Ukrainian SSR	5915	7205	7240	9600
1900-1930	S	Radio Norway Int'l, Oslo	9590	15225	15310	
1900-1930	M-F	Radio Portugal, Lisbon	11740	11870	15250	
1900-1930		Radio Sofia Bulgaria	7245	7155	9700	
1900-1930		Voice of Vietnam, Hanoi	9840	12020		
1900-1950		Deutsche Welle, Koln, W. Germany	9745	11810	13790	15390
1900-1955		Radio Beijing, China	6860	9470		
1900-2000		All India Radio, New Delhi	7412	11620	11935	15360
1900-2000		BBC, London, England	9410	9740	12095	15070
			15400	17885		
1900-2000		CBC Northern Quebec Service	9625	11720		
1900-2000		CBN, St. John's, Newfoundland	6160			
1900-2000		CBU, Vancouver, British Colombia	6160			
1900-2000		CFCF, Montreal, Quebec	6005			
1900-2000		CFCN, Calgary, Alberta	6030			
1900-2000		CHNS, Halifax, Nova Scotia	6130			
1900-2000		CKWX, Vancouver, British Colombia	6080			
1900-2000		CFRB, Toronto, Ontario	6070			
1900-2000		(US) Far East Network, Tokyo	3910			
1900-2000		HCJB, Quito, Ecuador	11790	15270	17790	
1900-2000		KYOI, Saipan	9455			
1900-2000		Radio Algiers, Algeria	9509	9685	15215	17745
1900-2000		Radio Australia, Melbourne	6035	6060	6080	7205
			7215	9580		
1900-2000		Radio Ghana, Accra	6130			
1900-2000		Radio Havana Cuba	11800	11950		
1900-2000		Radio Jordan, Amman	9560			







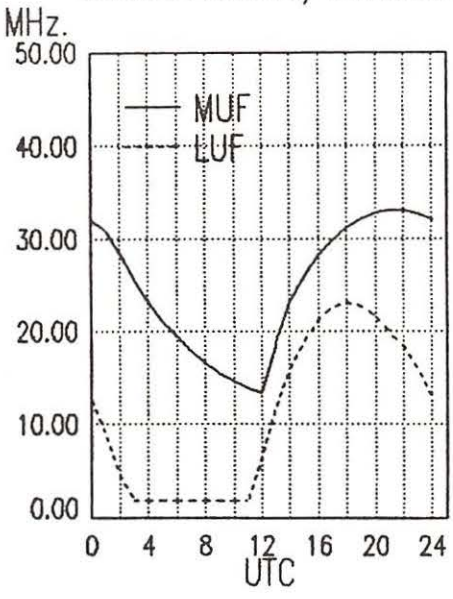
frequency section

1900-2000		Radio Korea, Seoul, South Korea	9870	15575		
1900-2000		Radio Kuwait, Kuwait	11665			
1900-2000	M-A	Radio Malabo, Equatorial Guinea	9553	[ML]		
1900-2000		Radio Moscow, USSR	5905	6030	7150	7170
			9540	9755	9765	9825
			9875	11840		
1900-2000		Radio New Zealand, Wellington	11780	15150		
1900-2000		Radio Prague, Czechoslovakia	5930	7345		
1900-2000		Radio Riyadh, Saudi Arabia	9705	9720		
1900-2000		Radio RSA, South Africa	7295	15365	17795	
1900-2000		Radio Zambia, Lusaka	9580			
1900-2000		Spanish Foreign Radio, Madrid	11790	15375	15395	
1900-2000		Superpower KUSW, Utah	15650			
1900-2000	A,S	Swaziland Commercial Radio	6155			
1900-2000		Trans World Radio Swaziland	3205			
1900-2000		Voice of America, Washington	9700	9760	11760	15205
			15410	15445	15580	15600
			17785	17800	17870	
1900-2000		Voice of Ethiopia, Addis Ababa	9595			
1900-2000		Voice of Kenya, Nairobi	6100			
1900-2000		Voice of Nigeria, Lagos	7255	11770		
1900-2000		WCSN, Boston, Massachusetts	21640			
1900-2000		WHRI, Noblesville, Indiana	13760	17830		
1900-2000		WINB, Red Lion, Pennsylvania	15295			
1900-2000	S-F	WMLK, Bethel, Pennsylvania	9465			
1900-2000		WRNO, New Orleans, Louisiana	15420			
1900-2000		WYFR, Oakland, California	11855	15566	17845	
1900-2000		WYFR Satellite Net, California	11830	13695	15375	
1910-1920		Radio Botswana, Gaborone	3356	4820		
1920-1930	M-A	Voice of Greece, Athens	6225	7430	9395	9425
1930-1940		Radio Togo, Lome	5047			
1930-1945		Radio Finland, Helsinki	6120	9530	11755	
1930-2000		ABC, Katherine, Australia	2485			
1930-2000		Radio Beijing, China	6955	7480	9440	
1930-2000		Radio Bucharest, Romania	7145	9690	9750	11940
1930-2000		Radio Budapest, Hungary	6110	7220	9585	9835
			11910	15160		
1930-2000	M-F	Radio Canada Int'l, Montreal	9555	11945	15325	17875
1930-2000		Radio Finland, Helsinki	6120	9550	11755	15185
1930-2000		Radio Sofia Bulgaria	9700	11720		
1930-2000		Radio Yugoslavia, Belgrade	5980	9620	9660	
1930-2000		Voice of Republic of Iran	6080	9022		
1930-2000		WINB, Red Lion, Pennsylvania	15185			
1935-1955		RAI, Rome, Italy	7275	7290	9575	
1940-2000	M-A	Radio Ulan Bator, Mongolia	9575	11870		
1945-2000		All India Radio, New Delhi	9755	11860		
1950-2000		Vatican Radio, Vatican City	6190	7250	9645	

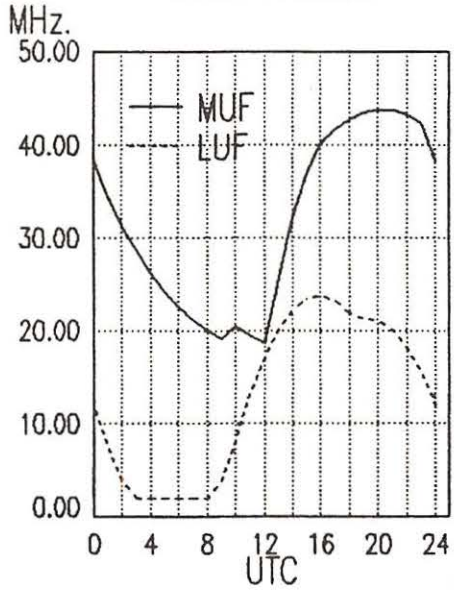
2000 UTC [3:00 PM EST/12:00 PM PST]

2000-2005	S-F	Port Moresby, Papua New Guinea	3295	4890	5960	5985
			6020	6040	6080	6140
			9520			
2000-2005		Radio Zambia, Lusaka	3345	6165		
2000-2010	A	Radio Zambia, Lusaka	3345	6165		
2000-2010		Voice of Kenya, Nairobi	6100			
2000-2015		Radio Togo, Lome	3220	5047		
2000-2015	M-A	Radio Ulan Bator, Mongolia	9575	11870		
2000-2015		Trans World Radio, Swaziland	3205			
2000-2025		Radio Beijing, China	6955	7480	9440	9745
			11715			
2000-2025		Radio Bucharest, Romania	5990	6105	7145	7195
			9570	9690	11940	
2000-2030		Kol Israel, Jerusalem	7462	9435	9855	
2000-2030		Radio Australia, Melbourne	6035	7205	7215	9580
			9620			
2000-2030		Radio Berlin Int'l, East Germany	9665	11920	15255	
2000-2030		Radio Ghana, Nairobi	3366	4915		
2000-2030		Radio Norway International, Oslo	15310			
2000-2030		Radio Polonia, Warsaw, Poland	7125	7145	9525	
2000-2030	M-F	Radio Portugal Lisbon	11740			
2000-2030		Radio Sofia, Bulgaria	7245	9560	11735	15310
2000-2030		Swaziland Commercial Radio	6155			
2000-2030		Voice of Nigeria, Lagos	7255			
2000-2030		Voice of Republic of Iran	6080	9022		
2000-2045		All India Radio, New Delhi	7412	9755	9910	11620
			11860			
2000-2050		Radio Pyongyang, North Korea	6576	9345	9640	9977
2000-2056		Radio RSA, South Africa	7295	15365	17795	
2000-2100	M-A	ABC, Alice Springs, Australia	2310	[ML]		
2000-2100		ABC, Katherine, Australia	2485			
2000-2100	M-A	ABC, Tennant Creek, Australia	2325	[ML]		
2000-2030		BBC, London, England	5975	6180	6195	7325
			9410	9740	11785	11820
			12095	15070	15260	15400
			17760	17885		
2000-2100		CBC Northern Quebec Service	9625	11720		
2000-2100		CBN, St. John's, Newfoundland	6160			
2000-2100		CBU, Vancouver, British Colombia	6160			

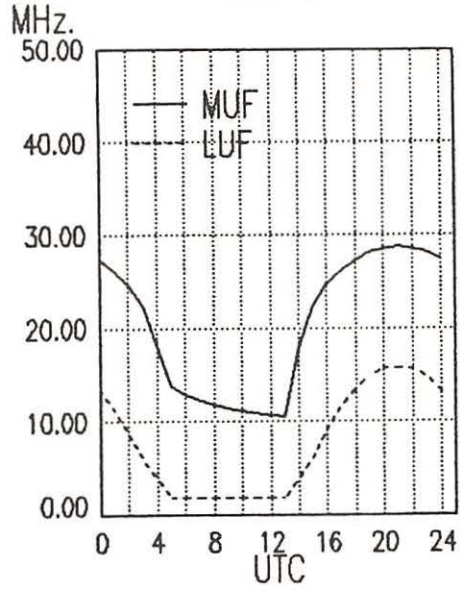
West Coast To
Central America/Carribean



West Coast To
South America



West Coast To
Alaska



frequency section

2000-2100		CFCF, Montreal, Quebec	6005				
2000-2100		CFCN, Calgary, Alberta	6030				
2000-2100		CHNS, Halifax, Nova Scotia	6130				
2000-2100		CKWX, Vancouver, British Colombia	6080				
2000-2100		CFRB, Toronto, Ontario	6070				
2000-2100		(US) Far East Network, Tokyo	3910				
2000-2100		King of Hope, Southern Lebanon	6280				
2000-2100		KYOI, Saipan	9465				
2000-2100		Radio Havana Cuba	11800				
2000-2100		Radio Jordan, Amman	9560				
2000-2100		Radio Kuwait, Kuwait	11665				
2000-2100		Radio Malabo, Equatorial Guinea	9553v				
2000-2100		Radio Moscow, USSR	9765	9755	9825	9875	
			11840	15405			
2000-2100		Radio Moscow (British Service)	5905	6020	7115	7150	
			7170				
2000-2100		Radio New Zealand, Wellington	12050	15150			
2000-2100		Radio for Peace, Costa Rica	21555				
2000-2100		Radio Riyadh, Saudi Arabia	9705	9720			
2000-2100		Radio Zambia, Lusaka	9580				
2000-2100		Superpower KUSW, Utah	15650				
2000-2100		Voice of America, Washington	9700	9760	11760	15205	
			15410	15445	15580	15600	
			17785	17800	17870		
2000-2100		Voice of Nigeria, Lagos	11770				
2000-2100		WCSN, Boston, Massachusetts	11680				
2000-2100		WHRI, Noblesville, Indiana	13760	17830			
2000-2100		WINB, Red Lion, Pennsylvania	15185				
2000-2100	S-F	WMLK, Bethel, Pennsylvania	9465				
2000-2100		WRNO, New Orleans, Louisiana	15420				
2000-2100		WSHB, Cyprus Creek, S. Carolina	17612.5				
2000-2100		WYFR, Oakland, California	9455	11855	15566	17612.5	
2000-2100	M-A	WYFR Satellite Net, California	11830	13695	15375		
2005-2100		Radio Damascus, Syria	9950	12085			
2010-2100	A,S	Voice of Kenya, Nairobi	6100				
2015-2100		ELWA, Monrovia, Liberia	11830				
2015-2000		Radio Berlin Int'l, E. Germany	9665	13610	15255		
2025-2045		RAI, Rome, Italy	6165	9575			
2030-2055		Radio Polonia, Warsaw, Poland	6095	7285			
2030-2100		BBC, London, England	5975	6180	7325	9410	
			11750	12095	15070	15400	
			15260	17760	17885		
2030-2100		Radio Australia, Melbourne	9580	9620			
2030-2100		Radio Beijing, China	6955	7480	9440	9745	
			11790				
2030-2100		Radio Korea, Seoul, South Korea	6480	7550	15575		
2030-2100		Radio Netherland, Hilversum	9540	9895	11740	15560	
2030-2100		Radio Tirana, Albania	9480	11835			
2030-2100		Voice of Africa, Cairo, Egypt	15375				
2030-2100		Voice of Vietnam, Hanoi	9840	12020	15010		
2045-2100		All India Radio, New Delhi	7412	9550	9910	11620	
			11715				
2045-2100		IBRA Radio, Malta	7110				
2045-2100		Vatican Radio, Vatican City	9625	11700	11695	15120	

2100 UTC [4:00 PM EST/1:00 PM PST]

2100-2105		Radio Damascus, Syria	9950	12085			
2100-2105		Radio Zambia, Lusaka	3345	6165			
2100-2110		Vatican Radio, Vatican City	6190	7250	9645		
2100-2110	A,S	Voice of Kenya, Nairobi	6100				
2100-2115		IBRA Radio, Malta	7110				
2100-2125		Radio Beijing, China	6955	7480	9440	9745	
			11790				
2100-2125		Radio Bucharest, Romania	5990	6105	7145	7195	
			9690	11940			
2100-2125		Radio Netherland, Hilversum	9540	9895	11740	15560	
2100-2130	S	Radio Austria Int'l, Vienna	5945	6155	9585	9870	
2100-2130		Radio Budapest, Hungary	6110	7220	9585	9835	
			11910	15160			
2100-2130		Radio Japan, Tokyo	5965	7140	7280	17835	
2100-2130		Radio Korea, Seoul, South Korea	6480	7550	15575		
2100-2130		Radio Sweden, Stockholm	6065	9655			
2100-2130		Swiss Radio Int'l, Berne	9885	13635	15570		
2100-2135		ELWA, Monrovia, Liberia	11830				
2100-2145		WYFR, Oakland, California	5950	9455	9852.5	11855	
			17612	17845	21525	21615	
2100-2200		WYFR Satellite Net	11830	13695	15375		
2100-2150		Deutsche Welle, West Germany	7130	9765			
2100-2150		Voice of Turkey, Ankara	9825				
2100-2155		Radio Beijing, China	6860	9470	9860		
2100-2200	M-A	ABC, Alice Springs, Australia	2310	[ML]			
2100-2200		ABC, Katherine, Australia	2485				
2100-2200	M-A	ABC, Tennant Creek, Australia	2325	[ML]			
2100-2200		All India Radio, New Delhi	7412	9910	11620	11715	
2100-2200		BBC, London, England	3995	5975	6005	6175	
			6180	7325	9410	11785	
			12095	15070	15260	15400	
2100-2200		CBC Northern Quebec Service	9625	11720			
2100-2200		CBN, St. John's, Newfoundland	6160				
2100-2200		CBU, Vancouver, British Colombia	6160				
2100-2200		CFCF, Montreal, Quebec	6005				
2100-2200		CFCN, Calgary, Alberta	6030				
2100-2200		CHNS, Halifax, Nova Scotia	6130				
2100-2200		CKWX, Vancouver, British Colombia	6080				
2100-2200		CFRB, Toronto, Ontario	6070				
2100-2200		(US) Far East Network, Tokyo	3910				
2100-2200		King of Hope, Southern Lebanon	6280				
2100-2200		KSDA, Agat, Guam	7365	15125			
2100-2200		KVOH, Rancho Simi, California	17775				
2100-2200		KYOI, Saipan	9465				
2100-2200		Radio Australia, Melborurne	15160	15240	15395	17795	
2100-2200		Radio Baghdad, Iraq	7280	9770			
2100-2200		Radio Jordan, Amman	9560				
2100-2200		Radio Moscow, USSR	5905	6055	7150	7170	
			7290	9505	9515	9590	
			9620	9625	9730	9765	
			9780	9790	9800	9820	
			9840	9875	11840	12030	
			12050	15405	15425	17720	
2100-2200		Radio for Peace, Costa Rica	21555				
2100-2200	A,S	Radio Malabo, Equatorial Guinea	9552.5				
2100-2200	A,S	Radio Zambia, Lusaka	9580				
2100-2200		Spanish Foreign Radio, Madrid	9765	11790			
2100-2200	M-A	Superpower KUSW, Utah	15650				
2100-2200		Voice of Africa, Cairo, Egypt	15375				
2100-2200		Voice of America, Washington	9700	9760	11760	15205	
			15410	15445	15580	15600	
			17785	17800	17870		
2100-2200		Voice of Nigeria, Lagos	15120				
2100-2200		WCSN, Boston, Massachusetts	11680				
2100-2200		WHRI, Noblesville, Indiana	9770	17830			
2100-2200		WRNO, New Orleans, Louisiana	15420				
2100-2200		WSHB, Cyprus Creek, S. Carolina	17750				
2103-2200		WINB, Red Lion, Pennsylvania	15185				
2110-2200		Radio Damascus, Syria	9950	12085			
2115-2200		Radio Cairo, Egypt	9900				
2125-2155	S	Radio Austria Int'l, Vienna	9870				
2130-2145		BBC, London, England*	5965	7160			
2130-2200		BBC, London, England*	6030	7230	9635		
2130-2200		HCJB, Quito, Ecuador	15270	11790	17790		
2130-2200	A,S	Radio Canada Int'l, Montreal	11880	15150	17820		
2130-2200		Radio Sofia Bulgaria	7115	7155	9700	11720	
2135-2150	S-F	ELWA, Monrovia, Liberia	11830				
2150-2200	M-F	ELWA, Monrovia, Liberia	11830				

2200 UTC [5:00 PM EST/2:00 PM PST]

2200-2205	M-F	ELWA, Monrovia, Liberia	3993	11830			
2200-2205		Radio Damascus, Syria	9950	12085			
2200-2210	M-H	Port Moresby, Papua New Guinea	3925	4890	5960	5985	
			6020	6040	6080	6140	
			9520				
2200-2210		Radio Sierra Leone, Freetown	5980				
2200-2215	M-A	ABC, Alice Springs, Australia	2310	[ML]			
2200-2215	M-A	ABC, Tennant Creek, Australia	2325	[ML]			
2200-2215		BBC, London, England*	5965	7160			
2200-2215	M-F	Voice of America, Washington	9640	11740	15120		
2200-2225		BRT Brussels, Belgium	5915	9925			
2200-2225		Radio Finland, Helsinki	6120	9670	11755		

frequency section

2200-2225		RAI, Rome, Italy	5990	9710		
2200-2225		Vatican Radio, Vatican City	6015	9615	11830	
2200-2230		ABC, Katherine, Australia	2485			
2200-2230		All India Radio, New Delhi	7412	9550	9910	11620
			11715			
2200-2230		CBC Northern Quebec Service	9625	11720		
2200-2330		Radio Beijing, China	3985	6165		
2200-2230	F	Radio Budapest, Hungary	6110	9585	9835	11910
			15160			
2200-2230		Radio Jordan, Amman	9560			
2200-2230	S	Radio Norway Int'l, Oslo	9605	11850		
2200-2230		Radio Prague, Czechoslovakia	6055			
2200-2245		BBC, London, England	3955	5975	6175	6180
			6195	7325	9410	9590
			9915	11955	12095	15070
			15260	15400		
2200-2245		Radio Berlin Int'l, East Germany	6125			
2200-2245		Radio Cairo, Egypt	7710	9900		
2200-2245		Radio Yugoslavia, Belgrade	5980	7130	9620	9660
2200-2250		Radio Baghdad, Iraq	7280			
2200-2255		RAE, Buenos Aires, Argnetina	11710	15345		
2200-2300		CBN, St. John's, Newfoundland	6160			
2200-2300		CBU, Vancouver, British Colombia	6160			
2200-2300		CFCF, Montreal, Quebec	6005			
2200-2300		CFCN, Calgary, Alberta	6030			
2200-2300		CHNS, Halifax, Nova Scotia	6130			
2200-2300		CKWX, Vancouver, British Colombia	6080			
2200-2300		CFRB, Toronto, Ontario	6070			
2200-2300		(US) Far East Network, Tokyo	3910			
2200-2300		King of Hope, Southern Lebanon	6280			
2200-2300		KVOH, Rancho Simi, California	17775			
2200-2300		KYOI, Saipan	15405			
2200-2300		Radio Australia, Melbourne	15160	15240	15320	15395
			17795			
2200-2300		Radio Canada Int'l, Montreal	9760	11945		
2200-2300		Radio for Peace, Costa Rica	21555			
2200-2300		Radio Havana Cuba	7140			
2200-2300		Radio Moscow, USSR	4795	4860	5980	6030
			7115	7150	7170	7230
			9505	9515	9590	9620
			9625	9780	9790	9820
			9840	9625	12050	15405
			15425	17570	17605	17700
2200-2300		R. Peace & Progress, Moscow	4795	7360	17720	
2200-2300		SBC Radio One, Singapore	5010	5052	11940	
2200-2300	M-A	Superpower KUSW, Utah	15580			
2200-2300		Voice of America, Washington	11760	15185	15290	15305
			15320	17735	17740	17820
			18157	USB		
2200-2300		Voice of Free China, Taiwan	9852.5	9925	11805	
2200-2300		Voice of the UAE, Abu Dhabi	6170	9595	11965	
2200-2300		WCSN, Boston, Massachusetts	9495			
2200-2300		WHRI, Noblesville, Indiana	9770	17830		
2200-2300		WINB, Red Lion, Pennsylvania	15185			
2200-2300		WRNO, New Orleans, Louisiana	15420			
2200-2300		WSHB, Cyrus Creek, S. Carolina	17640			
2200-2300		WYFR, Oakland, California	5950	11830	11855	13695
			15170	15375	17612	17845
2215-2230		BBC, London, England*	11820	15390		
2230-2300	A,S	CBC Northern Quebec Service	9625	11720		
2230-2300		Kol Israel, Jerusalem	9435	9010	11605	
2230-2300		Radio Austria Int'l, Vienna	9870	11780		
2230-2300		Radio Mediterran, Malta	6110			
2230-2300		Radio Polonia, Warsaw, Poland	5995	6135	7125	7270
2230-2300		Radio Sofia, Bulgaria	9700	11720		
2230-2300		Radio Sweden, Stockholm	11925	SSB		
2230-2300		Radio Tirana, Albania	7215	9480		
2230-2300		Radio Vilnius, Lithuanian SSR	6100			
2230-2300		Swiss Radio Int'l, Berne	6190			
2245-2300		All India Radio, New Delhi	6055	7215	9535	9910
			11715	11745		
2245-2300		BBC, London, England	3955	5975	6175	6195
			7325	9410	9570	9590
			9915	11785	11945	12095
			15260	15400	17875	
2245-2300		Radio Berlin Int'l, E. Germany	6125			

2300 UTC [6:00 PM EST/3:00 PM PST]

2300-2315		BBC, London, England	3955	5975	6175	6195
			7325	9410	9570	9590
			9915	11945	12095	15070
			15260			
2300-2330	S	KGEI, San Francisco, California	15280			
2300-2330		Radio Berlin Int'l, E. Germany	6125	9730		
2300-2330		Radio Canada Int'l, Montreal	9755	11730		
2300-2350		Radio Pyongyang, North Korea	13650			
2300-0000		Radio Luxembourg	6090			
2300-2330		Radio Mediterran, Malta	6110			
2300-2330		Radio Sofia, Bulgaria	9700	11720		
2300-2330		Radio Vilnius, Lithusanian SSR	7165	7400	9640	9800
			13645	15180	15455	
2300-2330	M-A	Superpower KUSW, Utah	15580			
2300-2345		WINB, Red Lion, Pennsylvania	15185			
2300-2345		WYFR, Oakland, California	5950	9505	11855	15440
			17845			
2300-2350		Voice of Turkey, Ankara	7160	9445	9680	
2300-0000		All India Radio, New Delhi	6055	7215	9535	9910
			11715	11745		
2300-0000		CBC Northern Quebec Service	6195	9625		
2300-0000		CBN, St. John's, Newfoundland	6160			
2300-0000		CBU, Vancouver, British Colombia	6160			
2300-0000		CFCF, Montreal, Quebec	6005			
2300-0000		CFCN, Calgary, Alberta	6030			
2300-0000		CHNS, Halifax, Nova Scotia	6130			
2300-0000		CKWX, Vancouver, British Colombia	6080			
2300-0000		CFRB, Toronto, Ontario	6070			
2300-0000		(US) Far East Network, Tokyo	3910			
2300-0000		KVOH, Rancho Simi, California	17775			
2300-0000		KYOI, Saipan	15405			
2300-0000		Radio Australia, Melbourne	15160	15240	15320	15395
			17795	21740		
2300-0000		Radio for Peace, Costa Rica	21555			
2300-0000		Radio Japan, Tokyo	11800	15195	17810	
2300-0000		Radio Moscow	7295	7370	9625	9790
			9840	15295	15420	17570
			17655	21790		
2300-0000		Radio Moscow, (N. American Srvc)	6045	6170	7115	7150
			7195	7215	7310	9530
			9720	9765	12050	13605
			15405	15245	15425	17605
			17700	17720	21530	
2300-0000		Radio Polonia, Warsaw	5995	6135	7125	7270
2300-0000		Radio Thailand, Bangkok	9655	11905		
2300-0000		Voice of America, Washington, DC	15290	17735	17820	18157
			USB			
2300-0000		WCSN, Boston, Massachusetts	9495			
2300-0000		WHRI, Noblesville, Indiana	9770	17830		
2300-0000		WRNO, New Orleans, Louisiana	15420			
2315-2330		BBC, London, England*	11820	15390		
2315-0000		BBC, London, England	5975	6005	6175	6195
			7325	9515	9590	9915
			11945	12095	15260	15435
			17875			
2330-0000		Radio Korea, Seoul, South Korea	15575			
2330-0000		Radio Tirana, Albania	7065	9760v		
2330-0000		Voice of Vietnam, Hanoi	9840	12020	15010	
2335-2345	M-A	Voice of Greece, Athens	7430	9905		
2345-0000		BBC, London, England*	3915	6080	7180	9580
2348-0000		WINB, Red Lion, Pennsylvania	15145			

Share the Fun!

Find a frequency we missed? Let us know by writing frequency manager Greg Jordan at 1855-I Franciscan Terrace, Winston-Salem, NC 27127. Send your special QSLs or good photocopies to share with other readers to QSL, PO Box 98, Brasstown, NC 28902.

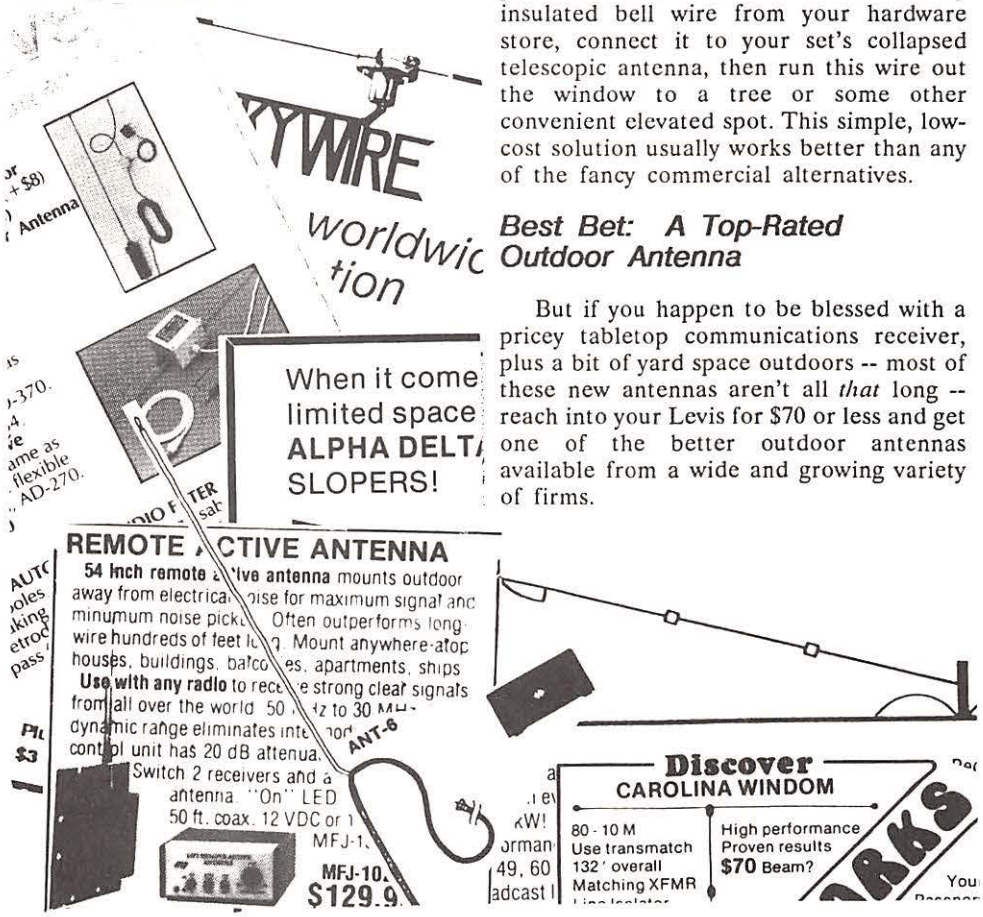
Lawrence Magne
Editor-in-Chief
Passport to World Band Radio

Shortwave Listening Antennas

One thing that really separates old-fashioned shortwave radios from modern world band radios is the antenna. You know, long wires, like the Jolly Green Giant's clothesline. In the old days -- that's *old*, as in the 1930's and '40's -- nearly all shortwave radios required these monster outdoor spider webs if signals were to be received even reasonably well.

Long Antennas No Longer Mandatory

For the past ten years or so, though, that's all changed. Most world band radios now come equipped with ordinary little telescopic antennas -- the same type used for FM reception -- that work surprisingly well at pulling in faraway stations. In part, this has come about because of advances in radio circuits, which are now usually quite sensitive. Additionally, world band stations are stronger than they once were -- the result of more powerful transmitters, highly directional aerials and a recent upsurge in relay sites and transmitter "swap" arrangements by broadcasters.



So, here's the reality, and it's good news: For the vast majority of world band listening, *no* external antenna is necessary. Indeed, with many inexpensive portables, a large outdoor antenna can completely overwhelm the set's cost-accountant innards, actually making reception *worse* than if the set's built-in telescopic antenna were being used.

External Antennas Useful for Tough Catches

Why, then, even consider an accessory antenna? In a nutshell, you're a reader of *Monitoring Times*, not an ordinary casual world band listener. You will almost certainly want to dig deeply into the treasure trove of stations the shortwave spectrum has to offer to those who seek uncommon results.

The first point is to ensure that your receiver is equal to the task of handling the high signal levels a good accessory antenna can deliver. If you have a modest portable the best solution is almost invariably best to purchase a hank of 20 feet or so of ordinary insulated bell wire from your hardware store, connect it to your set's collapsed telescopic antenna, then run this wire out the window to a tree or some other convenient elevated spot. This simple, low-cost solution usually works better than any of the fancy commercial alternatives.

Best Bet: A Top-Rated Outdoor Antenna

But if you happen to be blessed with a pricey tabletop communications receiver, plus a bit of yard space outdoors -- most of these new antennas aren't all *that* long -- reach into your Levis for $70 or less and get one of the better outdoor antennas available from a wide and growing variety of firms.

Testing these sorts of antennas, as opposed to speculating about their performance, takes months and hundreds of man hours, so we haven't been able to run each and every available model through our test hoops. However, the tests that we have made show the "sloper" design, available either from dealers or from the manufacturers -- Alpha Delta (Box 571, Centerville OH 45459) and Antenna Supermarket (Box 563, Palatine IL 60067) -- is a top performer.

Very nearly as good is the fully preassembled "Eavesdropper" trap dipole model, also from Antenna Supermarket. The model-to-model differences, detailed in our *RDI White Paper* on popular outdoor antennas, are subtle, but they can be significant, depending on what and when you're tuning in, and other factors.

Active Antennas, the Next Best

If you have a superset, but no land for an outdoor antenna, an active, or amplified, indoor-type antenna is a perfectly acceptable alternative. What an active antenna consists of, fundamentally, is a short antenna element that is fed into an amplifier, which makes up for the relatively low signal strength emanating from that element.

Active antennas, which are usually about double the cost of high-performance outdoor wire antennas, usually work best if you're not located near local radio transmitters -- AM, FM or whathaveyou.

They also work as they should only if the antenna and amplifier module are separated by a reasonable length of wire. This allows the receiving element -- the antenna itself -- to be placed well away from your radio's noisy electronic circuitry and, instead, to be mounted near or just outside a window, where reception is best. This is why such active antennas as the otherwise-excellent MFJ-1020A, should be avoided unless you plan to connect your own separate antenna to the amplifier module.

The best of the active antennas, as determined in our *RDI White Paper* study, is the British-made Datong AD370, available in North America from Electronic Equipment Bank (516P Mill St. NE, Vienna VA 22180) and Gilfer Shortwave (52 Park Ave., Park Ridge NJ 07656). Contrary to a report appearing elsewhere indicating Datong antennas are only available in the US with 220V European-style ac power supplies, the AD370, as well

High-Tech German Portable

Around May of this year, the long-anticipated world band "Stealth" portable is scheduled to hit the market. The new entry, Grundig's $599 Satellit 500, will be only the third world band radio to be equipped with synchronous detection -- one of the most important features for improving the listening quality of world band signals. Until now, the only model under $1,000 that offers this high-tech advance has been the Sony ICF-2010/ICF-2001D, which has only so-so audio quality.

The '500 features some unusual memory characteristics. To begin with, you can enter an abbreviated station name along with the stored frequency. Thus, when you push a memory button, not only the frequency appears on the display, but also the station's name. You can see how this will look by glancing at the cover of the 1989 *Passport to World Band Radio*.

The European version of the '500 has permanently stored on ROM (read-only memory) most of the primary channels for Deutsche Welle. This apparently is not to be included in the version destined for North America, but it does hint at a day when quasi-automated tuning of at least some of the major stations will be a reality.

Audio quality also promises to be superior. The '500 has separate bass and treble controls, plus Grundig's tradition of placing heavy emphasis on audio fidelity.

We plan to begin testing the '500 in earnest starting sometime during the next few weeks. We'll report our usual warts-and-all findings in *Monitoring Times* as soon as our lab tests and "hands on" reports are completed.

Disappointing New Portable from Sangean

Less encouraging is the dawning reality of Sangean's forthcoming ATS-808 portable, which originally seemed to show so much promise. It now appears that this compact portable, which reportedly is to list at $299 in the US, probably will not, after all, come equipped with synchronous detection. Not only that, it appears as though it won't even demodulate ordinary single-sideband signals.

Indeed, aside from the '808's compact size, simplicity and inclusion of a dual-zone clock, it's hard to see what advantages this model might have over its established, less-costly sibling, the Sangean ATS-803A, also widely sold as the Radio Shack/Realistic DX-440. Fortunately, the new '808 will complement, not replace, the existing and sensibly priced '803A -- which does handle single-sideband signals quite well.

as its AD270 sibling, are available from both EEB and Gilfer with 120V ac power supplies. EEB's adapter, for example, appears on their price list at $9.95.

Close runners-up are the venerable Dymek DA100D (Stoner Communications, 9119 Milliken Ave., Rancho Cucamonga CA 91730) and MFJ-1024 (MFJ, 921 Louisville Rd., Starkville MS 39759). The major difference between the DA100D and MFJ offerings is that signals from the DA100D get stronger as the frequency being received rises, whereas the MFJ excels at lower frequencies. Thus, if you listen during the hours of daylight, the DA100D makes good sense. However, at the other extreme, if you are a DXer who primarily chases tropical signals (below 5.5 MHz), then the MFJ should be more appropriate.

Two Antennas Are Better Than One

Finally, if you are a serious landed DXer using a $1,000 rig, then consider setting up not one, but two good antennas ... preferably perpendicular to each other and in different parts of the lawn. You see, antennas react differently depending on all manner of conditions: the frequency being tuned, the angle of reception of the signal you're trying to hear, the soil conductivity at your location, the height of your antenna, the presence of nearby objects, and so forth.

The hard reality is that among the better antennas one model may be best when you're listening to a given signal at a certain time, whereas another may do better with another signal. If you've spent all that money on your receiver and are staying up until the wee hours to try for the Falkland Islands, it makes little sense to cut corners on antennas. This is why some better communications receivers have two antenna inputs ... and one, the venerable Drake R-7, had fully *three* antenna inputs! It's also why professional monitoring posts invariably bristle with a wide variety of antennas.

Homemade Antennas Can Perform Splendidly

Finally, in these times of radios-on-a-chip and the like, there is still room for "rolling your own." The supersized inverted-L minutely detailed in the *RDI White Paper* on outdoor antennas is one example of this, and such sources as *The ARRL Antenna Book* provide a wealth of designs from which to choose. High-quality parts for antenna construction are available from such specialty sources as Universal Shortwave (1280 Aida Dr., Reynoldsburg OH 43068) and Newark Electronics (3466 Progress Dr., Cornwall Heights PA 19020).

Passport's "RDI White Paper" equipment reports contain everything -- laboratory measurements, "hands-on" panel findings and user comments -- available in the US from EEB and Universal Shortwave; in Canada from PIF Book-by-Mail, C.P. 232, L.d.R., Laval PQ H7N 4Z9; and in Europe from Interbooks, Stanley, Perth PH1 4QQ, Scotland, and the Swedish DX Federation.

A free catalogue of the latest may be obtained by sending an SASE to these firms or to Publications Manager, International Broadcasting Services, Ltd., Box 300M, Penn's Park PA 18943 USA.

You can hear Larry Magne's equipment reviews the first Saturday, plus *Passport* editors Don Jensen and Tony Jones the third Saturday, over RCI's *SWL Digest*. For North America, *SWL Digest* is heard at 8:10 PM EST on 5960, 9535, 9755, 11845 and 11940 kHz, repeated the following Tuesday at 8:30 AM EST on 9635, 11855 and 17820 kHz.

Radio Shack HTX-100

Ten Meter Amateur Transceiver

Rising sun spot numbers and novice enhancement have encouraged our friendly electronics marketing giant (Radio Shack) to once again enter the amateur radio market. Their first offering to hams is the HTX-100, a 25 watt SSB and CW transceiver.

There are several features on this neat transceiver that are bound to take the ham's fancy the first time he or she sees it. A headphone jack on the front panel, for example, allows the ham's family relief from radio racket. And real jacks for the key and external speaker are welcome additions. CW operators will appreciate the TX/RX switch on the upper left corner of the HTX-100 that allows manual transmit/receive switching. This prevents the unit from switching on and off between characters when sending slow Morse.

Ten easily programmed memories lets the individual return quickly to a favorite frequency at the push of a button on the mike or front panel. In fact, the HTX-100's frequency can be controlled by one of three means, the front panel mounted tuning knob, up and down switch (also front panel mounted) or the up and down switches on the microphone. A scan mode allows the unit to scan the band in increments of the operator's choosing -- from a low of 100 Hz to 10 kHz. A .5 MHz step allows the operator to go from one end of the band to the other in only four steps (a neat and well thought out set-up).

Additional features are selectable power levels of 5 or 25 watts, Receiver Incremental Tuning (RIT), noise blanker and frequency lock. The metering system uses 5 LED's to indicate received signal strength and power output. A backlit LCD display is easily read in both daylight and at night. The knob controls have a white indicator stripe on them so their position can easily be seen in low light situations (very important in mobile operation). The noise blanker is worth special mention as it does indeed do a fine job of blanking ignition noise when the unit is installed for mobile use.

On top of all of this, Radio Shack has gone out of their way to create an excellent instruction manual -- everything from set-up to use is covered in easy to understand language.

Inside the HTX-100 shows signs of superb craftsmanship, the PC boards are well laid out and everything is neatly installed and easily identified.

Checking the specs on the test bench we found the test unit to put out a bit over seven watts in the low power position and 29 watts in high power (CW key down). Receiver sensitivity was .20 microvolts when measured with a 1 kHz signal and 100 percent modulation for a 10 dB signal to noise ratio (excellent). After a ten minute warm-up, there was no noticeable signal drift and the frequency readout was within 300 Hz of the signal generator. Audio output was three watts, plenty of power to overcome ambient noise in most mobile installations.

The rig is a dream to operate. On the first day of use in a mobile set up, this little unit worked stations in Russia, Italy and Sweden during the half hour drive to work. The antenna was a cut down 102 inch CB whip. Signal reports ranged from 5 X 5 to 5 X 9. Subsequent contacts with stations in Africa and South America were easily made from the mobile. Fixed operation provided contacts with stations on every continent (both SSB and CW) in a single weekend while using a extended Zepp antenna.

To sum it up, the HTX-100 has been well thought out, is easy to operate, and in general, an excellent buy. I would not hesitate to recommend it to anyone looking for good ten meter SSB CW rig. Congratulations Radio Shack!

Antenna Specialists

APR151.3 "On Glass" 144-174 MHz Antenna

Purchase of a new vehicle demanded installation of a new antenna for my two meter amateur operation. Naturally, the thought of drilling holes in my new car did not appeal to me. Thought was given to the new "On Glass" antennas that have been marketed in recent years. I chose the Antenna Specialists APR151.3, a half wave model that claimed excellent results without a ground plane.

Mounting the antenna on the glass was a snap that took only about half an hour total time. Getting the antenna to work decently was a different story.

The instruction manual has a cutting chart to aid the purchaser in setting up his antenna. Choosing 144 MHz as a starting point, the chart called for a length of 33 inches at that frequency. Since my

goal was a match at 146, this seemed to be satisfactory. Applying five watts of power indicated a terrible SWR, so following instructions I removed a quarter inch of antenna but still got a terrible SWR. Tuning to 146 seemed to indicate a better match (less than 3:1) and 147 was still better (about 2:1).

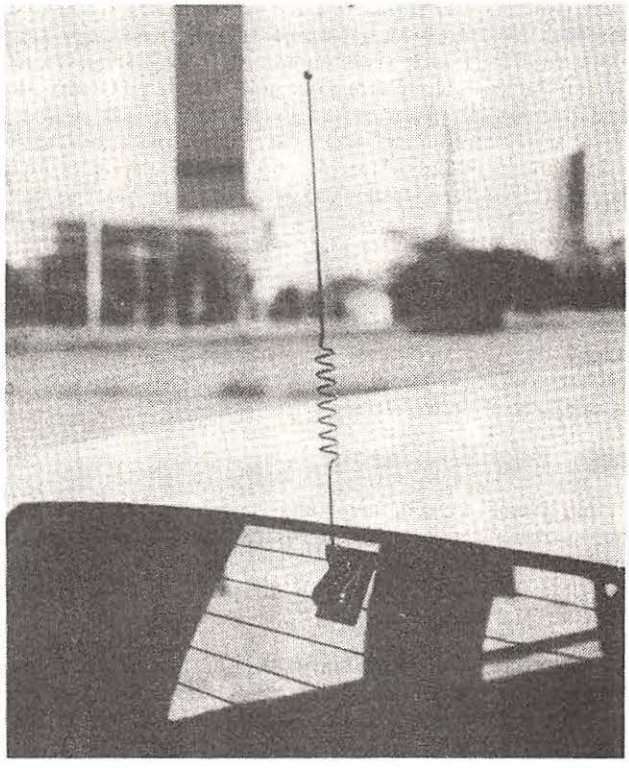
Gee, I cut the antenna too short! How the sam hill did that happen? Being Sunday, I could not call Antenna Specialists for an answer. So I decided to use the antenna -- I felt my rig would not be damaged by the mismatch, as it was protected.

Switching to high power (50 watts) I was in for a real surprise, the rig switched on and off at a rapid rate indicating a lot of RF getting into the rig. I made an RF choke by coiling up the feedline into a coil of two inch diameter and about three turns. This helped a bit, but a toroid at the transmitter was required before the rig could be run at high power. In addition, placement of the feedline was extremely critical.

I placed a phone call to the company the next day, and they admitted that the cutting chart was not accurate. Although they offered to send me a new whip, they also stated that they did not intend to change the chart in the future. (I thought this very odd). The company told me they did not have many complaints about RF getting into the rig though and mine was an isolated case. That, too, proved to be inaccurate. Of more than a dozen users of this antenna I talked too, all said they had problems with RF in the car!

Antenna Specialists has a long way to go with this antenna. It gets a rating of zero in my book.

Reviews by Ike Kerschner



Antenna Specialists' unique "On-Glass" antennas like the above CB antenna are a snap to mount.

Doug DeMaw

P.O. Box 98
Brasstown, NC 28902

Construct Your Own Project Boxes

Are you discouraged because commercial equipment boxes and cases cost so much? It is incredible that all of the parts for a particular project may cost as little as, say, $5, but a store-bought cabinet for your assembled circuit can have a $7 price tag hooked to it! If you have experienced this anguish, we're kindred souls.

I seldom use a commercial enclosure for my projects. First, it takes too long to obtain the product (I have to order my components by mail), and secondly, I object to paying a high price for what sometimes turns out to be an enclosure of inferior quality. Many of the imported boxes have cosmetic flaws, and they are made from very thin metal. Flimsy boxes that flex under stress do not please me!

I solved my dilemma many years ago when I elected to fashion my own equipment cases and chassis from available, low-cost materials. Someone may argue that homemade cabinets do not impart the professional look. Must we produce equipment that looks like it was factory built? Definitely, no! After all, we are experimenters. Our products are not being built for selling, but rather to suit our hobby needs. It is unlikely that some friend who visits your workshop will gasp in horror when he sees what you have built, even though he may think to himself, "Gosh, that sure is an ugly creation."

Materials We Can Use

Equipment foundations and enclosures can be fabricated easily from such materials as galvanized furnace ducting, single- or double-sided PC board, sheet aluminum (cookie sheets) and empty food containers. Aluminum cake and bread pans are useful as foundation units. Likewise for metal and plastic recipe boxes. Variety stores and lumber yards carry many materials that we can use for cabinet making. Heating and plumbing shops usually have scrap pieces of furnace ducting that you can buy for pennies.

I know an experimenter that uses Masonite for his chassis and panels. Strips of wood are used as rails to hold the chassis intact. Likewise for the covers. He uses no. 6 sheet-metal screws to affix the Masonite pieces to the wooden framework. When he needs a shielded box or cabinet, he simply glues flashing copper to the inner surfaces of the panel and cover. Most of his work looks like it was done by a skilled artisan.

Tools You Will Need

I purchased a used, heavy-duty paper cutter from an office supply surplus dealer. I use it for cutting PC-board sheets, thin aluminum and flashing copper. This provides a clean, square cut every time. I have not needed to sharpen the cutter blade during five years of frequent use.

A saber saw is an important aid if you intend to cut Masonite and sheet metal. Tin snips can be used, but I have never mastered the art of achieving edges that aren't rippled or crooked when using this hand tool.

A belt sander is a luxury item, but it can be used to smooth the edges of Masonite and PC board. Alternatively, you should equip yourself with a set of sheet-metal files for working on the raw edges of the cabinet stock. You may also use sandpaper and a sanding block for this task.

A propane torch is handy for soldering the mating surfaces of boxes and cabinets made from furnace ducting. I use a 40-watt pencil type of soldering iron for joining the walls of boxes made from PC-board material. A 100-watt soldering iron, or a soldering gun (250 watt) is too hot for PC-board stock, but should be just right for soldering flashing copper.

Finally, a machinist's square is essential for ensuring that everything is "dress right dress" before you cut the stock. You will also need a ruler or scale that has a resolution to 1/32 inch. This will keep your measurements uniform, or at least within acceptable limits. Nobody wants to build a lop-sided box!

Food Containers as Chassis and Cabinets

The next time you stroll through a food store, look at the various metal containers and envision one of them (minus label) as a small chassis. Picture the container with a coat of paint, some knobs and switches, and of course, some function labels. I can't recall how many times I ate food that didn't thrill me, just to acquire the container in which it came.

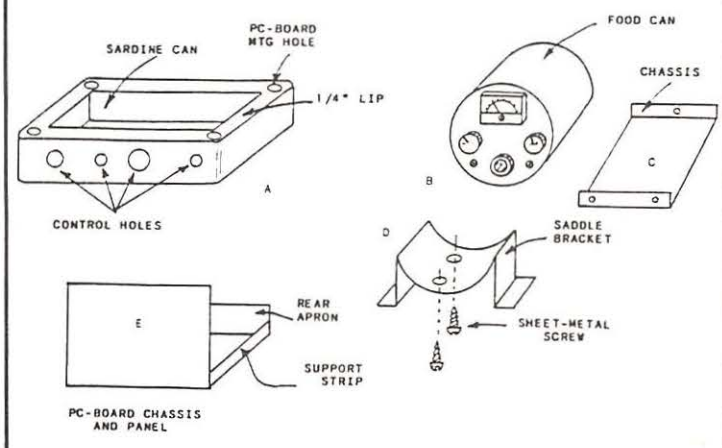


Fig. 1

Examples of homemade equipment chassis and enclosures. The assembly at A is made from a sardine can. The can bottom has a rectangular cutout to provide a lip for attaching a PC board. A nibbling tool may be used for the cutout. Example B shows how to fashion a food container into an equipment cabinet. A circular panel (front) is cut from aluminum, furnace metal or PC board with a nibbling tool. The bottom of the can is used as the rear wall of the enclosure. A metal chassis is seen at C. It may be attached to the front panel and rear wall of the can with sheet-metal screws. A saddle bracket is seen at D. It is screwed to the bottom of the can to provide a foot for the unit. Illustration E shows how to make a panel and chassis from PC-board sections (solder all seams) or furnace metal. No bending is required for this method. The rear apron may be used for mounting jacks.

Rectangular sardine cans are excellent as small chassis. I have also used round tuna-fish cans as foundation units. Some stores sell soda crackers in medium-size metal boxes that are rectangular. These have a press-on lid. I have built receivers and transmitters in a number of these boxes. If you eat the contents of a food can, the resultant chassis or enclosure is free!

Fig. 1 shows some ways to utilize food containers as project foundations. You may cut out the center section of the bottom side of a food container, while leaving a 1/4-inch lip of metal around the perimeter. This lip may be used to affix a piece of perforated board or a PC board on which your circuit is built. The PC board may be soldered to this lip, or you can use 4-40 screws and nuts to hold it in place. Fig. 1 also shows how to utilize a food can as a cabinet. Metal legs are soldered to the side of the can to keep it upright.

How to Bend Sheet Metal at Home

Few of us can afford to buy a sheet-metal shear or bending brake. We must seek alternatives to this monstrous, costly shop gear. Most of my metal bending is done with a large bench vise. I use two 8-inch pieces of angle iron in the vise jaws. Heavy-gauge aluminum angle stock may be substituted.

These pieces of angle iron are clamped between the vise jaws, with the stock to be bent placed between the two angle-iron pieces. I tighten the vise jaws, then exert pressure on the sheet metal with both hands until I obtain a right-angle (or other angle) bend. Pressure is exerted gradually. If I desire a sharper bend radius, I tap the metal along the bend with a rubber hammer.

Longer pieces of sheet metal may be bent by clamping two long sections of angle iron to the edge of your bench. Use medium or large size C clamps to hold the angle stock firmly in place. I place a short length of 2 x 4 lumber against the unbent stock, then push firmly until the bend is completed.

Adding the Finishing Touches

Once you have completed your homemade cabinet, box or chassis it will be time to give it a paint job of your color choice. Some basic steps are required first, by way of surface preparation.

You must first scrape away all of the flux residue where you have soldered the mating surfaces of your box. Steel wool or sandpaper can be applied next to ensure a flux-free seam.

Metal and PC-board enclosures need to be treated before painting them in order to ensure that the finish coat of paint will stick to them. I like to use a medium grade of sandpaper to abrade the metal surface. This produces tiny grooves that hold the paint to the metal. Do your sanding evenly in one direction (avoid circular rotation) because the grooves will show through the paint if they are not all in one direction.

Next, clean the work with hot soap and water, then rinse it thoroughly in clear hot water. Avoid touching the clean surfaces with your hands, because oil from your skin will prevent the paint from sticking.

I like to apply a coating of gray automotive primer paint after the metal is dry. You may buy this in spray cans from auto parts dealers and variety stores. Never allow the spray nozzle to be closer than 10 inches from your work if you want to prevent runs. Use a left-right sweeping motion as you paint. Allow a short period for drying (5 minutes), then add another coat of primer. Allow the work to dry for at least one hour at room temperature.

Now you may add the finish coat of paint. Select a color of your choice and spray it on the work in the same manner used when applying the primer coat. Allow the painted work to dry for 24 hours before applying labels. I use press-on lettering for my labels. After they are in place you may want to add a coating of clear spray lacquer to the cabinet and panel. This will add a protective coating to the labels and paint job.

If you have not used spray-can paint previously, I suggest you practice first on a small piece of metal. It won't take long to develop the artist's stroke needed to ensure a smoothly painted surface.

You may make your own labels by typing the control functions on adhesive-backed white labels of the type available from office supply stores (Avery brand, for one). Clear lacquer may be applied to these labels to keep them clean.

In Summary

I have tried to encourage you to adopt the do-it-yourself approach to cabinet construction. Homemade enclosures are quicker and less costly than store bought ones. But beyond those considerations, "Little Old Cabinet Maker, You" will experience the joys of constructing something of your own design, and tailored to the size requirements of your project. Your homemade cabinet will be the only one of its kind in all of the world - A true "ORIGINAL!"

Cooling a Hot Kenwood

by Michael B. Rubin

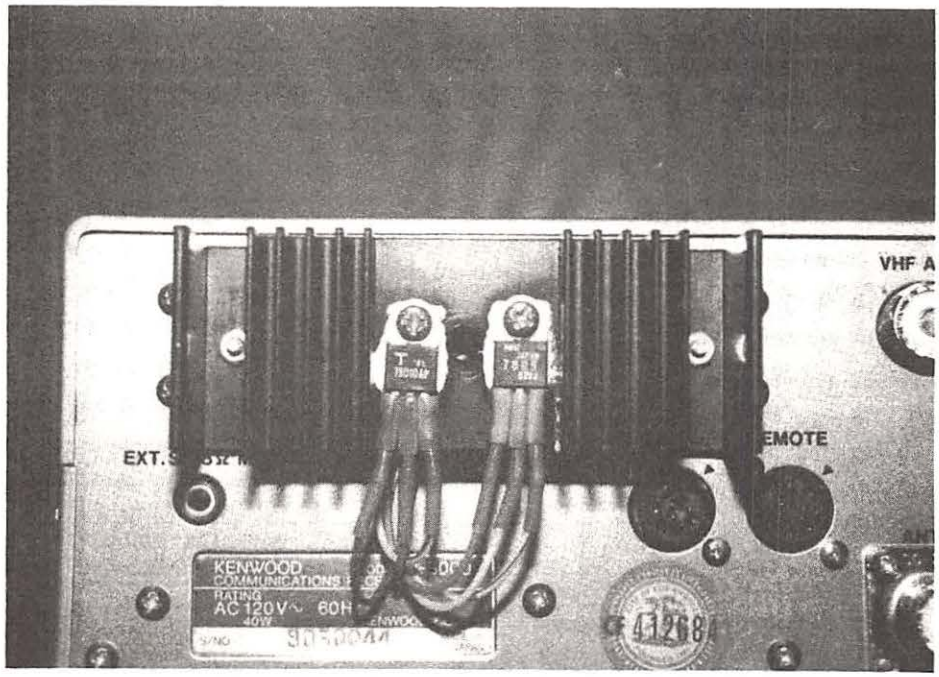


Photo 1

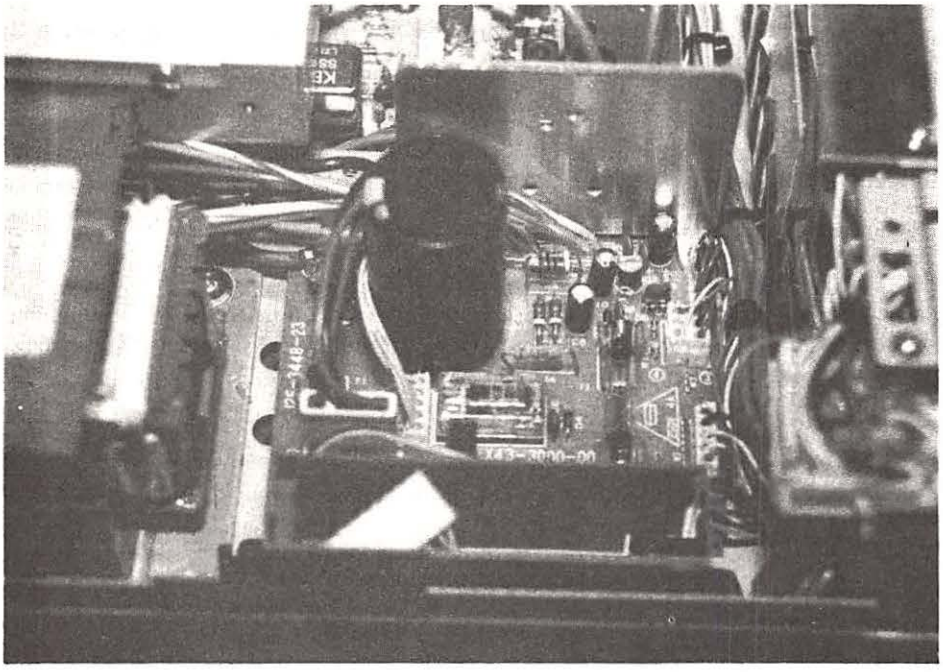


Photo 2

The Kenwood R-5000 receiver is one of the best of its kind on the market. It does every thing well but has one drawback: it runs hot. After reading all the write-ups about the R-5000, I knew I had to have one. I knew about the heat problem from what I had read before buying the radio, so knew what I was getting into.

But how hot is it? To be precise, before finding a cure I decided to take a few measurements. All measurements were taken with a digital temperature gauge that has an accuracy of +/- 1 degree F. After two hours of operation the outside case (top) temperature was 106 degrees.

Having a look around inside a new piece of equipment is always fun, and the R5000 was no different. The source of the heat was immediately evident -- the power supply is the culprit.

The power supply is on a small board about 3 x 3 inches and is located in the left front behind the S-meter. If your radio has been on for awhile, don't touch the silver heat sink. It will burn you!

The heat sink is totally inadequate and has no vent, so the heat just stays in the cabinet. We tried removing the speaker to allow some venting, but that only helped about 3 degrees. How about a small fan? Well, a fan would help a great deal, but why trash up a new radio with a fan? The only option we could find that would work and not cost an arm and a leg was to remove the problem. Putting in a larger heat sink didn't help because the heat still can not vent to the outside of the case.

You can see the answer from photo #1. We put the two voltage regulators outside the case. The two regulators PN-78010AP and PN-7805 run very hot. We measured the heat sink temperature inside the case at 136 degrees after two hours of operation. So you can see the radio can vent away 30 degrees of the heat it generates internally.

Locating a heat sink that would fit on the back of the radio and not interfere with the external speaker jack, the ACC jack and remote jack was not easy because it still had to be big enough to do the job, but not interfere with the external plugs. We found one that fit like it had been designed just for this problem. As you can see from the photo, it fits on the back of the radio and looks like it belongs there.

The modification requires drilling only three holes and removing the two voltage regulators from the power supply. I will walk you through this, one step at a time.

Remember, there is an old rule of thumb; if you can't hold your thumb on a component, it's too hot. First, disconnect the AC line cord and remove the top of the cabinet. You will not have to remove the bottom, so we will leave it in place. The first thing to do is unplug the speaker and set aside the top.

Locate the power supply (see Photo #2). Unplug all connectors. There will be seven in all. Remove the heavy black wire that goes to the chassis. You will not have to unsolder the heavy red wire, unless you want to.

Next, remove the four screws that hold the power supply board in place. What we are going to do here is remove the old heat sink and take the two voltage regulators off the board. The regulators are not the same, so it would help to make a drawing showing which one goes where.

Now, let's take a look at the drawing of the back of the radio. You will see there are three holes that have to be drilled: two to hold the heat sink on and one to pass the six wires back into the cabinet. The two for the heat sink are drilled to accept a 10-32 machine screw (number 11 drill) and the one for the wires is 3/8 inch because we will be putting a grommet in the larger hole. Turn the radio up side down when you do your drilling so the metal shavings don't fall into the radio. Deburr the holes and install the grommet.

Now let's turn our attention to the new heat sink and drill it for the two regulators. The same 10-32 size screws work okay here too. See the drawing for spacing. Deburr the holes and set aside. Now, let's remove the the regulators from the power supply board. I use a solder sucker, but solder wick is okay too. Make sure to leave the holes in the board clear and open.

Now mount the regulators on the new heat sink. First attach three wires to each regulator. solder a stranded #18 gauge piece of wire to each pin. Each wire should be 15 inches long; use a different color wire for each pin to make identification easy, and use heat shrink tubing on each pin so nothing shorts out.

Now put the regulators on the heat sink. Use some heat sink compound on each regulator. This is important for the transfer of the heat from the regulators to the heat sink (use white heat sink compound not clear). Push the six wires through the rubber grommet and mount the heat sink on the back of the radio.

Remember the drawing you made of the power supply board? Now take a look at it to see how things are connected. We mounted the 78010AP regulator on the left side of the heat sink and the 7805 on the right, the same way they were mounted on the power supply board.

Make sure you wire the regulator wires the same way they came from the power supply board. Use a small soldering pencil and be sure there are no solder bridges. Replace the power supply board remembering that the old heat sink is part of the mounting assembly. Plug in the seven connectors and screw the large black wire back into place. Plug in the AC cord, turn on the R-5000 and enjoy your cool Kenwood.

There will still be some heat come from the radio because there is a lot going on in that box and each part contributes some heat.

Monitoring Times invites you to submit your favorite projects for publication. For more information, contact technical editor Ike Kerschner at RD 1, Box 181A, Kunkletown, PA 18058.

How cool is the Kenwood now? Outside case temperature runs 81 degrees now, thatsa difference of 25 degrees.

That may not sound like much, but it will definitely help in reducing component failures due to heat! The new heat sink runs at 84 degrees, that's a 54 degree difference between the old and the new!

A limited supply of heat sinks for this project are available from Ohio Radio R&D 5421 Hickory Ct., Lewisburg, Ohio 45338. Price is $5.00 each plus $2.50 for shipping and handling.

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Projects for Experimenter's Workshop, while reviewed by our Technical Editor, are submitted by readers and remain experimental.

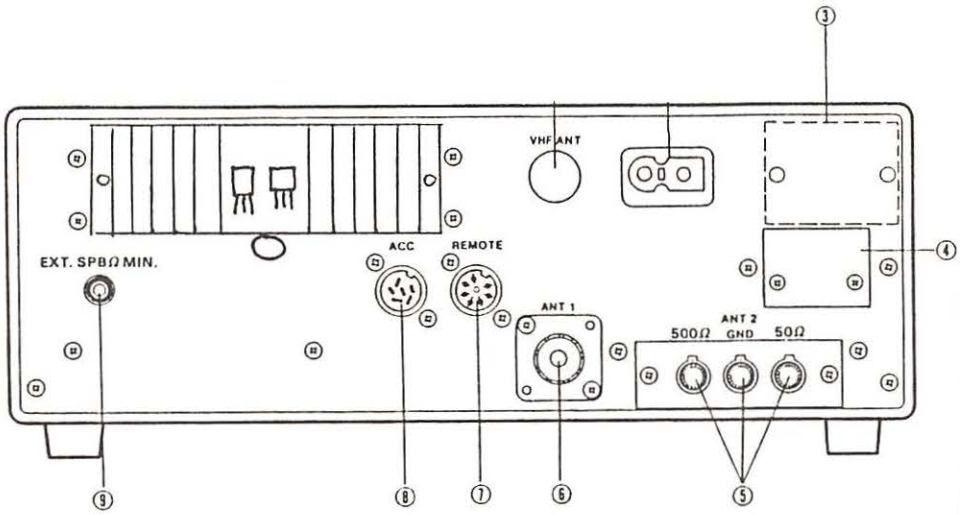

Fig. 3: *Heat sink must fit between VHF converter mounting screws*

February Addenda:

For those who wondered the purpose of Fig. 5 in last month's "Dynamic Duo" project, it is a power supply isolator/receiver coupler circuit for those who might wish to use the antenna without the regenerative RF amplifier. We apologize for the omission.

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Antennas: Past, Present, and Future

Across the past three decades, the most influential and respected text on antenna theory and design has probably been John Kraus's *Antennas*. Now, just "100 years from the date when the first antennas were invented," Kraus has revised and enlarged this classic text, dedicating the second edition "To Heinrich Hertz, who first invented antennas ... and Guglielmo Marconi, who pioneered in their practical application."

Kraus, like Hertz and Marconi, has done his share to further the field of antenna design. He is the inventor of the helical antenna, "the workhorse of space communications"; the corner reflector, "used by the millions for television reception"; and a number of other antenna designs.

Reaching for the Stars

Two quotations from the preface of *Antennas* seem to me to be particularly appropriate for passing on to you. The first provides a look at the link between radio's past and present: "Although there has been an explosion in antenna technology in the years since *Antennas* was [first] published, the basic principles and theory remain unchanged."

The second quotation is a statement which looks toward the future of antenna technology: "With mankind's activities expanding into space, the need for antennas will grow to an unprecedented degree. Antennas will provide the vital links to and from everything out there. The future of antennas reaches to the stars."

But, For the Present

Of course, the present is of the greatest interest to most of us. So, let's take a look at a couple of tips that may be useful to those who use a vehicular mounted antenna, or a handheld scanner or transceiver.

Did you know that experience has shown that, for mobile work, you get a gain of 1 to 2 dB or better by moving your mobile whip from the trunk-mount position to the center of the vehicle's roof? In a comparison between types of mounts, a magnetic mount can lose you 2 dB, or even more, compared to a permanent installation. In fact, the center of the vehicle's roof seems to be the best place on the vehicle to mount the antenna -- trunk lid, bumpers, and side-mounts all give less satisfactory results.

Of course, we don't always want to drill holes in the vehicle, and the temporary and magnetic mounts do provide quite satisfactory communications in many situations.

For the Pedestrian

Most of us have used the so-called "rubber duckie" antenna, which consists of a short coiled antenna protected by some sort of plastic-tubing cover. This antenna is extremely popular, not because it is efficient (it is not), but because it is a very convenient size, and can perform satisfactorily in many situations where we have use for it.

Of course, the "stubby duck," which is something like half the length of the rubber duck, is an even more convenient size. So why isn't the stubby duck used enough to become really popular?

On the other hand, a 5/8 wavelength vertical antenna for your handheld is a definite asset when dealing with signals of marginal strength. I have often seen a 5/8 wavelength antenna allow communications in situations where a rubber duckie, or even a full length 1/4 wave antenna would not suffice.

So, why aren't 5/8 wavelength antennas more popular than the rubber duck? Primarily for two reasons: First, they are expensive compared to the rubber duck or the 1/4 wave, and second, and most important, they are very big. They hit the ceiling in many rooms, catch on doors as you pass through, and add enough weight that the handheld is hard to handle with one attached. It's good to have one in your briefcase or backpack, but for the reasons just discussed, you will probably want to use it only when the going is too tough for the smaller antennas.

Aim High!

While we're on the subject of marginal signal reception, let's mention the fact that you can improve reception on a handheld by increasing the height of your antenna. That means that if you could just get the handheld's antenna up in a tree, you could probably increase your communications range. So, at times when you are trying to get that signal which won't quite make it, try elevating the antenna.

One way to do this is to go to the upper story of a building and stand at a window which faces in the direction of the signal you are trying to capture. (Make sure the window has no metal screen.) When outside, you may be able to climb a tree to get that antenna, handheld and all, even

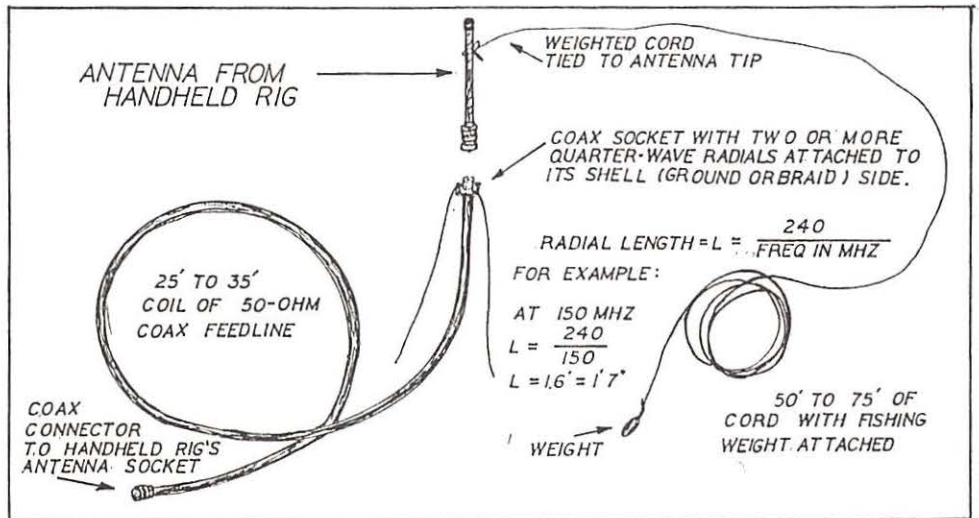

FIG. 1. KIT FOR HIGH-MOUNTING HANDHELD-RIG ANTS.

higher.

But climbing a tree with a handheld in your hand is neither easy nor recommended. A safer, and for many of us, a more practical approach is to carry a roll of light cord and a small weight with us to "climb the tree" for us. A small groundplane affixed to one end of a length of coax feedline can fit easily in a backpack or briefcase, and can be mounted high in a tree or other handy elevated structure with this cord by "just a flick of the wrist," so to speak.

To use this setup (see Figure 1), merely toss one end of the weighted cord over a convenient tree limb, or other convenient high-mount. (Don't even think of coming close to electrical lines, and watch out near buildings, to avoid breaking windows with the weight!)

Remove the antenna from your handheld, snap it into position on the groundplane end of the coax, plug the other end of the coax onto your handheld antenna connector, and pull the antenna into its high position. Often, from this elevated position, you can enjoy communications which are impossible at ground level!

RADIO RIDDLES

Last Month: Last month I asked if you knew that some remarkable work with a single directional beam antenna actually provided the initial insights which led to establishing the very important field which we know today as "radio astronomy?"

Well, the facts are that in 1930 the Bell Telephone Labs asked a young engineer named Karl Jansky to study the origin of troublesome static, or "atmospherics," which had long been a serious problem in long distance radio communications. Jansky used an 8-element Bruce curtain beam antenna as a "direction-finder" in his attempt to establish the origin of the annoying static.

In the course of his investigation, Jansky found that there was always a faint static "hiss" present, even when static associated with thunderstorms was absent. In what was then an amazing revelation, Jansky showed that this noise was "cosmic static" and was emanating from the center of our own galaxy! The continued study of such extraterrestial radio signals has led, step by step, to the field we now know as radio astronomy.

High gain beam antennas remain a vital part of the technology which supports radio astronomy, and various designs, including helical antennas and parabolic dish antennas, are utilized for this work. These antennas, which map the skies in amazing detail, are often referred to as "radio telescopes."

This Month: In the last 1930s, John Kraus invented the world-famous W8JK flat top beam. This beam was the first of the compact close-spaced beams, represented today more frequently by the Yagi-Uda and cubical quad designs. One particular feature of the W8JK beam was quite revolutionary, and led to the enduring popularity of compact beams. What was this revolutionary feature?

Find the answer to that, and much more, next month in your copy of *Monitoring Times*. 'Til then, Peace, DX, and 73.

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ask bob

Bob Grove, WA4PYQ

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***Q.** Our local police department is installing a trunked radio system. Can I install the frequencies in my scanner to follow the channel switching? (Harold Baker, Falmouth, MA)*

A. Absolutely. Like cellular telephones in the 800 MHz range, trunked base frequencies in the 856-861 MHz range will be exactly 45 megahertz higher than mobile frequencies and will automatically switch among unoccupied channels to avoid interference with channels presently in use.

Unlike cellular, however, there are only five channels per group, and public safety has only 12 groups (plus 8 discrete frequencies). Each successive channel is exactly 1 MHz from the last.

For example, if you hear a public safety base station on 856.2125 MHz, there should be activity as well on the other four: 857.2125, 858.2125, 859.2125 and 860.2125 MHz. Since there may be more than one group of channels assigned to your service, and you don't know which channel of the group you have heard, look up and down from that frequency in 1 MHz steps.

***Q.** What is the formula for cutting an antenna to proper length? (Billy Rollins, Procious, WV)*

A. We usually plan for a half-wave antenna because it is most efficient when fed at the center with 50 ohm coax. To find the length, divide 468 feet (or 5500 inches for VHF/UHF) by the frequency in megahertz.

For example, a center fed, half wave antenna for 7 MHz would be 67 feet in length; for 155 MHz it would be 36 inches long. So why are ground plane antennas and mobile whips for 155 MHz only 18 inches long? Because the ground plane (car body or radial elements) comprises half the antenna.

For receiving purposes, such an antenna will also work well at three times the frequency (and other odd multiples as well, but its pattern becomes erratic). Thus, the 7 MHz antenna works well at 21 MHz and the 155 MHz whip works great at 465 MHz.

R2000 SCAN SPEED HINT

Occasionally, a reader will accidentally make a discovery of interest to fellow hobbyists; such is the case of Gregory McIntire of Belle Fourche, South Dakota. Greg had owned his Kenwood R2000 for five years before he recently found a way to increase the PG SCAN (program scan) function by a simple touch of a switch.

The three pushbuttons on the front panel allow three separate tuning speed selections; by pressing one of the previously unpushed buttons slightly, all three buttons will pop out into their unpressed positions, allowing yet a fourth -- and faster -- tuning speed than the factory-preset "FAST" selection.

While a rapid tuning scheme like this may have limited value in shortwave listening, it is a big help while scanning the VHF spectrum with the VC10 converter installed!

PRO2004 MODIFICATION SERVICES

No product in the history of consumer radio has proved as popular among home experimenters for modifications and improvements as the Realistic PRO2004 scanner. While articles have appeared in *MT* and elsewhere on how to perform these mods, many non-technical types hesitate to remove the cover and attack the innards of a sophisticated piece of electronic equipment.

We recently had the pleasure of acquiring a unit professionally modified by Lester Jernigan. His improved PRO2004 had an LED S-meter -- beautifully installed, by the way; continuous 800-1300 MHz frequency restoration; 30-channels-per-second scan/search speed; internal wideband preamplifier; altered BNC connector for a better fit; AGC output jack; 400 channel expansion; and squelch improvement.

Les has the service available for your PRO2004 as well. Send a self-addressed, stamped envelope for a descriptive list of his services and kits: LESCOMM, PO Box 2406, Orange Park, FL 32067-2406.

Grove Enterprises (140 Dog Branch Rd., Brasstown, NC 28902) has initiated a modification service of their own. They offer a "turbo" scan speed increase (30 channels per second) for $25 and a 400 channel memory expansion with a matching keyboard overlay), also $25. Prices include return UPS shipping and a disabling of the audible "beep" at no extra charge if requested at the time of order.

***Q.** Are there sources other than the National Technical Information Service (NTIS) for FCC frequency lists?*

A. Yes. Bruce Heald, 6886 Jefferson St., North Branch, MI 48461, is a conscientious researcher who keeps up to date with the FCC data base. Send an SASE to him for a list of his services and fees.

***Q.** When some international broadcasters' signals fade on my new Kenwood R5000, the signal light goes out and the receiver mutes to complete quieting. Am I doing something wrong? (Herb Siegel, Chelsea, MA)*

A. I'd be willing to bet you have the squelch knob set above the fully-counterclockwise (off) position. This is a common oversight among shortwave listeners who (understandably) don't expect squelch on a shortwave receiver.

***Q.** Since 30-50 MHz low band is dead except out in the country, would scanners limited to reception above 115 MHz be better performers in terms of image rejection than those which also cover 30-50 MHz? (Bruce Heatley, Buffalo, NY)*

A. Image rejection is improved by up-conversion to a higher frequency, not down-conversion, so omitting 30-50 MHz (which, incidentally, is still popular in many areas) would not help at all.

***Q.** Will I be able to use my PRO2004 scanner in Sydney, Australia, with 240 volt, 50 Hz power? Will I be able to hear the same kinds of activity there as in the States? (Melvan Cauthon, Ladson, SC)*

A. The PRO2004 has only a 120 VAC primary winding; you will need a step-down transformer for 240 volt operation. If the transformer does not get unduly hot with the 50 Hz line frequency operation, it should work fine. You can take care of

both problems by purchasing a 240 VAC/12 VDC power supply in Australia.

Yes, Sydney should be booming with VHF/UHF activity. There will be some minor differences in frequency allocations, but the PRO2004 will handle them all.

Q. While monitoring cellular calls, I find that some of them cut off in mid sentence, while others can be heard for considerable time. How come? (RB, Waterford, MI)

A. Cellular telephone systems automatically equalize their busy use by sensing how many mobiles are presently using a particular cell (transmitter/receiver antenna site) at any one time, and which site has the stronger signal for a particular caller.

If the original cell is getting filled with callers ("cell loading") and a channel becomes available on a cell closer to the moving vehicle, the call is "handed off" to that new cell on a different frequency, accounting for the sudden loss.

If loading is not severe and the vehicle is stranded in rush hour traffic, it is likely that the entire transmission will occur on one channel. Don't forget, however, that monitoring cellular -- or any mobile -- radio telephone conversation is now illegal under the provisions of the Electronic Communications Privacy Act of 1986.

Q. What effects do radio waves have on the human body? (Donald Michael Choleva, Euclid, OH)

A. The human body is a poor conductor, so electromagnetic energy which penetrates it is partially turned to heat which can injure tissue. While there is considerable debate as to what levels of energy and what frequency ranges are most harmful, it appears that a person must be standing pretty close to the source of the radiating energy to be affected.

For the most part, persons living directly below high-voltage power lines, those who use walkie-talkies on a regular basis and individuals who are in the environment of high-powered radio transmitters are those for whom the studies show the greatest concern.

SWLs and scanner users have no additional concern; their radios have absolutely no influence on them (other than keeping them up at night!).

Q. How can I find out who is using my shared channel on a GMRS system? I have requested them to identify, but they won't. (John R. Lee, Bartlesville, OK)

A. For territorial disputes on GMRS, I recommend you contact the Private Radio Bureau of the Federal Communications Commission, 1919 M St., Washington, DC 20554.

Q. Is there currently available a digital to analog decoder for descrambling encrypted communications heard on a scanner? (Eric Carvill, East Sussex, England)

A. No, not for consumers. Even if you had an identical digital privacy system to the one in use, it would be ineffectual without having the appropriate coded instructions fed into it.

A top flight engineer whom I know said that if he had approximately 30 minutes of recorded audio to sample and about two weeks to work on it, he could probably crack it. But by then it would be too late. Of course, if the system users did not reprogram the code, it would be much quicker next time!

Here in the United States, federal agents use the same code for their digital scrambling system until they suspect it has been compromised, often by the theft of a radio or a vehicle containing a radio. At that time, all radios must be re-encoded.

Q. The new 1989 edition of your Shortwave Directory has been very helpful in identifying HF signals, but I notice the caveat, "Listings have been encoded to detect unauthorized republication." How is it possible to encode frequency listings without destroying their accuracy? (Anton L. Pickard-Ferguson, Edmonton, Alberta)

A. An excellent question! There are several ways. We include exclusive listings that have not appeared elsewhere and mix them with standard entries; we substitute names of adjacent large cities when an actual site may be in a suburb; we contact agencies just prior to publication to purge obsolete listings; we utilize verified off-the-air "hits" for additions; we sequence listings or channel numbers that may not be adopted within that agency; and we title our lists uniquely.

Obviously, not all of the tricks are used all of the time, but enough of them are sprinkled through the book that plagiarism is obvious.

Q. I connected my Sony ICF2010 portable receiver to my ham antenna and enjoyed improved reception. Unfortunately, the next morning, I made a lengthy transmission with my amateur rig -- and forgot to remove the antenna, a fact born out by the popping, sizzling, arcing sounds followed by the smell of burning wire coming from the Sony. Any recommendations? (John Todd, Boise, ID)

A. Yes. A new ICF2010 is only about $340 from most equipment suppliers.

Q. Where can I write to Norm ("Mr. Scanner") Schrein? (Gilles Thibodeau, Lac-Megantic, Que.)

A. At PO Box 291918, Kettering, OH 45429

Q. I would like to take my scanner across the border into Canada on a summer trip. Are there any complications? (Jim Alberts, Lansing, MI)

A. None whatsoever. Simply be sure to take a bill of sale to establish your ownership so that there is no questions regarding intent to resell.

Questions or suggestions sent to MT are printed in this column as space permits. If you prefer a reply by return mail, you must include a self-addressed, stamped envelope.

LETTERS

continued from page 3

• Jim Lange of Moxee, Washington, says that he's been "asked to join the monitoring panel" of a station he declines to name. "What do they do and is it worth the time it will take?" asks Jim.

Our first rule of thumb here at *Monitoring Times* is to refuse all such invitations where the first assignment is to break into a secure U.S. Government military installation. Our second rule of thumb is to be a good capitalist and ask the station how much they plan on paying us for this "honor." The latter usually separates the serious stations from those who offer such positions as listener traps.

Monitoring Panels can be traps when their purpose is to get you to tune in a station several times a day for an hour or two at a crack -- in the guise of helping the station choose frequencies, or whatnot. Obviously, it's just a way to get you to listen.

It's the same as those bogus "clubs" you can join. All you have to do, says the literature from the station, "is listen to Radio Tirana three times a day for 64 days." To become a "gold" member or some bull like that, the period increases until you've made a commitment to spend the rest of your life plugged into the station. My suggestion is to politely decline all such honors if the money isn't good.

• "Is the Sony ICF-2003 able to receive SSB signals, yes or no?" asks Robert Fraser of Cohasset, Massachusetts. Yes. "But," says *MT* equipment reviewer Larry Magne, "it's no [Sony ICF] 2010." The problem is that the radio only tunes in 1 kHz increments and you have to use a little thumb control to fine tune for the SSB. Sorry. Couldn't give you a simple answer.

• Rodney Sargent of Lubbock, Texas, wants to know how to convert kilohertz into megahertz. Simple, Rod. You divide by 1000 (move the decimal point three places to the left). Conversely, to convert megahertz to kilohertz, you multiply by 1000 (or move the decimal point three places to the right).

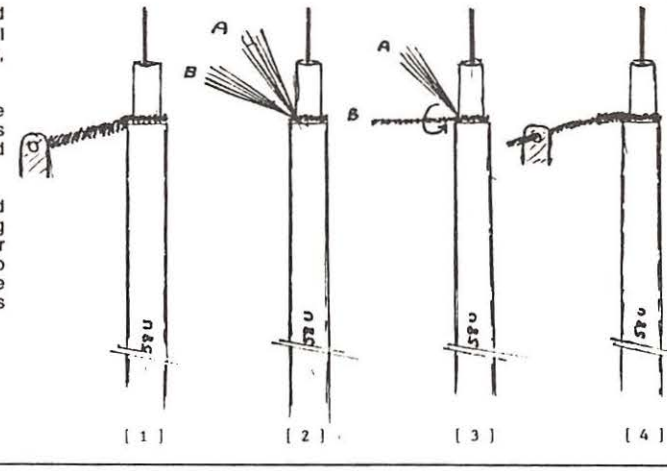
• Hugh Hawkins of San Antonio, Texas, came up with a little trick "that makes soldering braided shield on coax and other wires much easier -- especially when it is necessary to insert it through a small hole in a ground lug or other point that has a hole; jacks, etc." Above is Hugh's trick in two easy steps.

[1] Braiding is too large and stiff to go through small hole in grounding lug, jack, etc.

[2] Dress coax or other wire with braided shielding as usual. Separate the braid into two parts (A & B)

[3] Twist one part of the braid (A) or (B) tight. Keeping the strands of the other part straight and flat, wrap three times around the twisted part. Cut off excess and tin sparingly.

[4] It works!



• The always charming Leslie Edwards passes along the schedule for the Voice of the UAE in Abu Dhabi: 2200-0200 UTC on 6170, 9595 and 11965 kHz. "9595 reception," says Leslie, "is good here [in southeastern Pennsylvania]."

• In regard to an earlier tip in this column about hearing AFRTS via satellite, David Brooks of Athens, Georgia, suggests dish owners try the AFRTS channel -- F2, Transponder 22 "and tune your audio to 5.94 MHz using a narrow bandwidth." David says that it appears to be "the same format that was heard on good ole 6030 kHz." Thanks, David.

• Richard Draper, N4SKI, of Greer, South Carolina, enjoyed the GWEN article in November's "Federal File" column. "It was both informative and well presented!" he says. "However, I thought the readers might like a clarification of the relationship between baud rate and data rate.

"By definition, baud expresses the number of transitions (changes) per second in a data signal. In terms of a simple teletype modulation scheme, each frequency shift represents one (1) baud. Many modulation schemes used for data transmission," he says, "including the ones used for most 300 and 1200 baud telephone modems, use one (1) baud period to represent one (1) bit of data. However, in other data modulation schemes, each baud period represents more than one bit of data." The bottom line, says Richard, is that baud rate is not necessarily equal to data rate.

• Our old buddy, Charles West of Santa Ana, California, drops us a line. Says Charles, "through your efforts and publications, I talked myself into going further into radio and am now ham KB6TWA."

Congratulations, Charles! That's great. And we're really honored to have played a part, no matter how small, in getting another ham on the air! We'll all be listening.

• *MT*'s Ike Kerschner, himself a ham of no small repute, got the guys on the local repeater talking when he recently criticized some brother hams who "couldn't leave the house without the handheld." Give it a rest, suggested Ike, who made a call for more "well-rounded" hams.

Arnal Cook, a Navy pilot aboard the USS Nimitz, disagreed with Ike although he admitted that he had "agonized over this very question many times. My wife would silently ask, 'must you *this* time' every time I tok the radio along. But how do you know which time is *the* time when you may be able to use the radio to save someone's life, or prevent a crime or limit the damage of a fire?

"Did I ever save anyone? I helped once. And how about a near-miss? The day I had to call an ambulance for myself when I amputated my finger tips on a planer? The need for my radio became apparent when the shop supervisor lost his composure and couldn't find the number to phone the ambulance -- posted directly over the phone. I had to direct my own first aid.

"It is such a small price to pay for the life that may be saved. Do you really feel good driving around with your fuel gauge on empty?"

Good point, Arnal. Thanks for sharing your thoughts on the matter.

Letters should be addressed to ***Letters to the Editor,*** *Monitoring Times, P.O. Box 98, Brasstown, NC 28902 and should include the sender's address and telephone number. Not all letters can be used. Those that are will often be edited and excerpted. Because of the volume of mail received, personal replies are not always possible.*

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Ads for Stock Exchange must be received 45 days prior to the publication date.

NON-COMMERCIAL SUBSCRIBER RATES: $.25 per word - *Subscribers only.* All ads must be paid in advance to *Monitoring Times*. All merchandise must be personal and radio-related.

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For Sale or Trade: HALLICRAFTERS S-38D and S-38DM $40.00 and $65.00. Trade for electric trains. Bill Smith, RFD 238W3, Locust St., Douglas, Mass. 01516.

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Wanted: PANASONIC RF-2200. Louis Yadevia, 601 Church Lane, Upper Darby, PA 19082.

Wanted: BACK ISSUES OF MT, Jan 86 to Aug 86 inclusive, and Nov 86. Mike Bolbot, 6911 W. 115th St., Worth, IL 60482.

Wanted: GE CB Radio Model 3-5813B, LAFAYETTE CB HB-525B, HB-525C, HB-525D, HB-625, PRIVACOM 3-C, Battery pack, power supply. State price and condition. RADIO, 2053 Mohave Dr., Dayton, Ohio 45431

Sale: AMERICAN AIR-CHEXX, original cassette magazine of radio from mid-70's, Vols. 2 - 10. $80 postpaid. 404-A Charlotte St., Washington, NC 27889.

YAESU receiver RFG-7700 mint condition with memory. First $295 plus shipping. Bob Floyd [704] 366-6549.

Scanners for Sale: BC100XL $80. PRO-30 $75. PRO-32 $160. 800-400 MHz converter $40. Fred [203] 349-1242 evenings.

YAESU FRG-7700 shortwave receiver w/manual, mint condition $300; YAESU FRG-9600 scanner w/manual, mint condition $300. [606] 337-6282 after 5PM EST.

INDEX OF ADVERTISERS

CONVENTION CALENDAR

Date	Location	Club/Contact Person
Mar 4	Cave City, KY	Mammoth Cave ARC/ Joe Taylor N4NAS PO Box 858, Glasgon, KY 42141
Mar 4-5	Harlingen, TX	S TX ARS/ Davids Woolweaver K5RAV 2210 S 77 Sunshine St, Harlingen, TX 78550
Mar 5	Winchester, IN	Randolph ARA/ Kedrick Robbins W9QUH RR1 Box 389, Parker City, IN 47368
Mar 5	Belle Vernon,PA	Two Rivers ARC/ Chuck Gessnere KC3ET 2748 Glenny Lane, W. Muffin, PA 15122
Mar 5	Valhalla, NY	Westchester ECA/ Sarah Wilson N2EYX 2 Soundview Ave, White Plains, NY 10606
Mar 11	Sandwich, MA	Barnstable RC/ Richard Mannal KA10VN 24 Maple Ave, Centerville, MA 02632
Mar 11	Poughkeepsie,NY	Mt Beacon ARC/ Ronald Philips KB2DVC 8 Wilmont Ct, Hopewell Jct, NY 12533
Mar 11-12	Lafayette, LA	Acadiana ARA/ June Bodensteiner N5HBG 129 Patricia Anne Pl, Lafayette, LA 70508
Mar 12	Conneaut, OH	Conneaut ARC/ Ray Keskinen W8HUK 866 Sandusky St., Conneaut, OH 44030
Mar 12	Circleville,OH	Teays ARC/ Laird Campbell WB8PPH 8951 State Rt 188, Circleville, OH 43113
Mar 12	Sterling, IL	Sterling-Rock Falls ARS/ Susan Peters KA9GNR 511 8th Ave, Sterling, IL 61081
Mar 12	Indianapolis,IN	Morgan Co RA/ Aileen Scales KC9YA 3142 Market Place, Bloomington, IN 47401
Mar 18	Walton Bch, FL	Playground ARC/ HJ Huddleston KF4BU 925 Forest Ave, Ft. Walton Bch, FL 32548
Mar 18-19	Charlotte, NC	Roanoke Div Conv/ Mary Biggs KA4EXP 8435 Rust Wood Pl, Charlotte, NC 28212
Mar 19	W Hartford,CT	Insurance City RC/ Dave Faucher WA1UQC 23 Freedom Drive, Collinsville, CT 06022
Mar 19	Grosse Pt.Wds.MI	SE Mich ARA/ Steven Corso KV8G 34556 Summers, Livonia, MI 48154
Mar 19	Grayslake, IL	Libertyville & Mund.ARC/ Bob Dick NY9E 148 CW Golf Rd, Libertyville, IL 60048
Mar 24	Dover, NJ	Split Rock ARC/ Harvey Klein WA2JHT 410 Hillside Ave, Hillside, NJ 07205
Mar 25	Elizabethtown,KY	KY Stat Conv/ Chuck Strain AA4P Lot #3, Triangle MPH, Radcliff, KY 40160
Mar 25-26	Columbus, GA	Columbus ARC/ Edward Willoughby WB4TOM 4723 Marino St, Columbus, GA 31907
Mar 26	Annapolis, MD	RCMS of MD/ Izak Luchinsky (ANARC tour) PO Box 5722, Baltimore, MD 21208
Mar31-Ap2	Kansas City,MO	Midwest Div/ Chuck Miller WA0KUH 7000 NE 120th St., Kansas City, MO 64166
Apr 1	Grandville, MI	STARS ARA/ S.T.A.R.S. 1714 Havana SW, Wyoming, MI 49509
Apr 2	Madison, OH	Lake Co ARA/ Scott Farnham KO8O 10418 Briar Hill, Kirtland, OH 44094
Apr 2	Milton-Freewtr,OR	Walla Walla Vly ARC/ Jack Babitt WA5ZAY 1401 Pleasant, Walla Walla, WA 99362
Apr 7-9	Orlando, FL	N.FL Sect Conv/ John Lenkerd W4DNU 1046 Turner Rd, Winter Park, FL 32789
Apr 8	Little Rock, AR	AR State Conv/ Dale Temple W5RX 1620 Tarrytown Rd, Little Rock, AR 72202
APR 8	Up Saddle R,NJ	Chestnut Ridge RC/ John Meagher W2EHD 27 Fourth St, Closter, NJ 07624
Apr 9	Framingham, MA	Framingham ARA/ Marc Stern N1BLH 5554 Worcester Rd, Framingham, MA 01701
Apr 15	Birmingham, AL	Birmingham ARC/ James Pilman KA4ZQA P.O. Box 603, Birmingham, AL 35201
Apr 15	Fergus Falls,MN	Lake Region ARC/ Keith McKay Rt 1 Box 46, Battle Lake, MN 56515
Apr 15	Flemington, NJ	Cherryville RA/ Marty Grozinski NS2Kj 6 Kirk Bride Rd, Flemington, NJ 08822
Apr 15	Charleston, WV	Charleston ARC/ Jack Kibler K8WMX 182 Monterey Dr, Albans, WV 25177
Apr 15-16	Spokane, WA	Spokane RA/ Ivan Brown N7BPO West 728 Spofford Ave, Spokane, WA
Apr 16	Sullivan, IL	Moultrie ARC/ Vernon Jack K9SWY 916 W Strain, Sullivan, IL 61951
Apr 16	Lebanon, PA	Appalachian ARG/ Homer Luckenbill WA3YMU 105 Walnut St, Pine Grove, PA 17963
Apr 16	Raleigh, NC	Raleigh ARS/ Chuck Littlewood K4HF 2005 Quail Ridge Rd, Raleigh, NC 27609
Apr 16	Southington,CT	Southington ARC/ Chet Bacon KA1ILH 138-1/2 Summit St, Plantsville, CT 06479-1125
Apr 22-23	Augusta, GA	Augusta ARC/ Carroll Norton NA4I 2704 Lumpkin Rd, Augusta, GA 30906
Apr 28-30	Dayton, OH	Dayton Hamvention/ Hara Arena Conf & Expo 1001 Shiloh Springs Rd, Dayton, OH 45415

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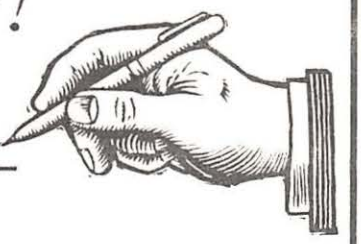

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A couple of comments from *MT* readers:

Received last September: "The ultimate compliment: I missed most of the Cleveland Brown's vs NY Giants football game on last night 'cause my September copy of MT arrived yesterday." - John Cassidy, Connecticut

"I find MT more oriented to serious DXers than [another publication] and it actually saves me money; MT makes the other magazines redundant." - W. Farmerie, Massachusetts

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Closing Comments

CTIA Charges Grove Enterprises

The Cellular Telecommunications Industry Association, a well-funded lobby of manufacturers and telephone companies who bought their way into Congress in 1986 to inflict the Electronic Communications Privacy Act, has made their first move against the hobby listener.

In a filing with the Department of Justice, CTIA registered a formal complaint against Grove Enterprises for advertising a service to restore cellular frequency coverage on scanners which are designed for such reception, but had been locked out at the factory.

The Federal Bureau of Investigation visited Grove headquarters on January 12, 1989, to outline the nature of the complaint. Citing specific advertisements in the Grove catalog and in *Monitoring Times*, CTIA referred to section 2512 of US Code Title 18, Chapter 19.

Very briefly, 2512 makes it unlawful to advertise, sell, manufacture or even possess any "device" which renders it "primarily useful for the surreptitious interception of electronic communications." Does cutting a wire constitute a "device"? That is the singular procedure which restores cellular frequency coverage in all these scanners.

While it is flattering that CTIA considers Grove a worthy adversary, the lengthy and expensive interruption of business which a court battle would presently entail has led Grove to voluntarily discontinue advertising the service. The US Attorney has agreed not to prosecute.

Cellular Hypocrisy

The manufacturers of the scanners in question -- Uniden (Bearcat) and Tandy (Radio Shack), both members of CTIA--also make cellular telephones. It would be a conflict of interest to offer scanners which can monitor their self-described "private" 'phones.

But since these manufacturers don't make conventional VHF/UHF mobile telephones (which are also unlawful to monitor), they don't bother to delete those frequencies from their scanners. After all, the more the public is aware of the vulnerability to casual interception of conventional mobile 'phones, the better cellular will look--if CTIA succeeds in deluding the public that cellular systems are private.

The hypocrisy becomes even more outrageous when one learns that while CTIA persecutes small companies which offer cellular restoration, Uniden continues to manufacture scanners which receive cellular conversations right out of the box! As a matter of fact, among VHF/UHF consumer radios now on the market which include 800 MHz coverage, the majority offer cellular reception without modification!

Under ECPA, it seems that you can legally own any scanner or receiver on the market, but cannot listen in on mobile telephone calls. According to a spokesman for a major scanner manufacturer, the reason that some scanners have cellular capability which has been disabled at the factory is that if yet another recently-proposed law, requiring ECPA warning labels on radios, is passed, they may restore the cellular coverage.

The Cellular Privacy Myth

At present, CTIA prospers under its own momentum, unrestrained in its monopolistic domination of the mobile telephone market, bullying small companies which stand in the way of its march. As long as no one contests the absurdities and inconsistencies of ECPA, their growth will continue and their coffers will flourish.

Clarification of the new law would unquestionably part the clouds of uncertainty and fear, likely returning many traditional rights to listening. For example, the law clearly allows monitoring of any communication which is "readily accessible to the public." Scanners have been around for decades, and the fact that cellular transmissions are as readily accessible as police and fire calls would certainly come out in public hearings.

A judge may well look at the ECPA definition of "readily accessible" and find it false and unreasonable, eliminating protection of truly accessible communications despite the penmanship of Congress--and the self-serving intent of CTIA.

The cellular industry does not want to correct the misrepresentation propagated by their advertising that cellular telephones are, somehow, more private than other forms of mobile phones. The sunlight which would pervade such public hearings would prove very illuminating and dispell the privacy illusion.

ECPA has done no more to alter the listening habits of radio hobbyists than it has the talking habits of telephone users. For over half a century, communications privacy has been adequately protected under section 705 (formerly 605) of the 1934 Communications Act which specifically forbids an uninvited listener from revealing what he overheard or using that information for personal gain.

Many readers have sent in clippings showing an encouraging trend among enlightened judges across the nation toward indemnifying the hobby listener who stumbles across ECPA-protected transmissions. Still, sadly, hobbyists who tune across drug deals and other criminal activities no longer report them to law enforcement officials because of fear of prosecution under ECPA.

ECPA, a legal nightmare for the courts, is begging for clarification and revision. A test case should rectify many wrongs. Perhaps one of the attorneys who have expressed their indignation at such specious legislation will challenge the law in court.

Bob Grove
President, Grove Enterprises
Publisher, Monitoring Times

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